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HAROLD P. JANISCH - - - - - - Editor and Bus. Mgr.
S. J. DUNCAN-CLARK - - - - - - - Contributing Editor

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GEORGE WASHINGTON

First in War, First in Peace, First in the Hearts
of His Countrymen.—*Lee.*

HE STANDS the noblest leader who ever was entrusted with his country's life. His patience under provocation, his calmness in danger, and lofty courage when all others despaired, his prudent delays when delays were best, and his quick and resistless blows when action was possible, his magnanimity to defamers and generosity to his foes, his ambition for his country and unselfishness for himself, his sole desire of freedom and independence for America, and his only wish to return after victory to private life, have all combined to make him, by the unanimous judgment of the world, the foremost figure of history.

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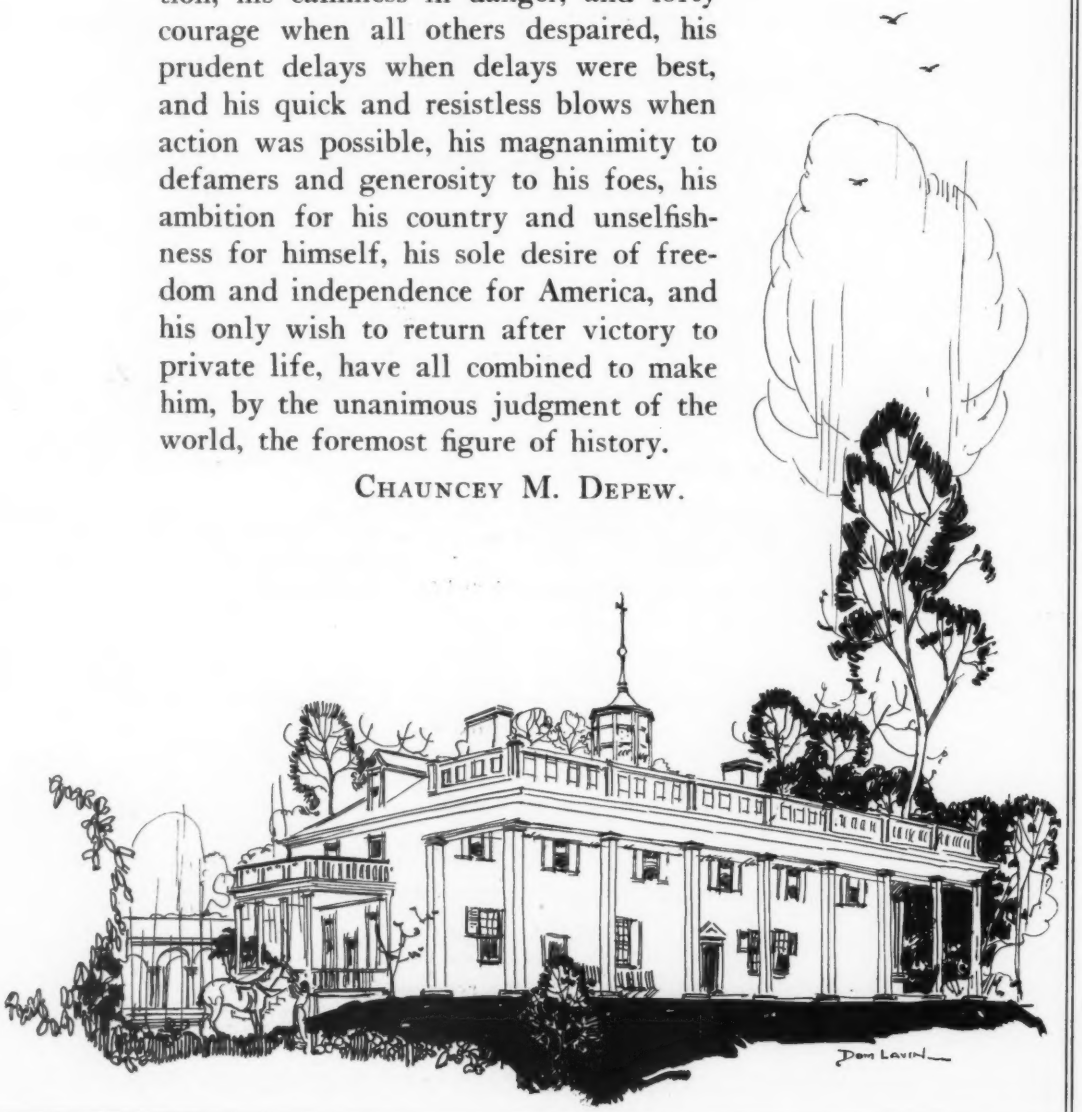


Traffic Light Systems

Survey of Mechanical Methods of Control in Different Cities of the United States

By TOM MARSHALL

CAESAR never had such a problem. And perhaps our descendants, who will live in cities with three or four tiers of streets will not be bothered with it either. Jay-walking then may be as archaic and unnecessary as Caesar's tunic is today.

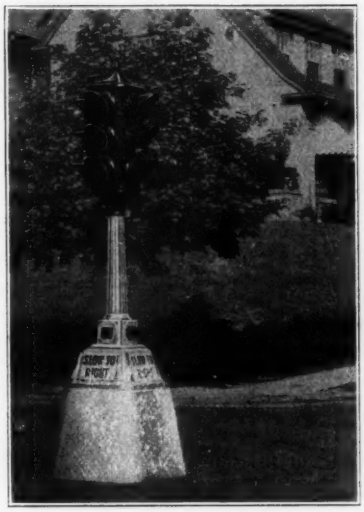
Traffic regulation is distinctly a problem of our times. Many panaceas have already been tried and found wanting. New methods have been evolved, discarded and other new ones evolved. So the cycle continues.

Today, there are few large cities, or good sized towns which are without a traffic regulating light system. Their effectiveness varies. Some eliminate long standing difficulties; others only aggravate conditions.

A successful system should decrease accidents, both personal and vehicular, increase the ease and rapidity of traffic movement through congested areas and yet not tie up side streets or other less crowded thoroughfares, open up shopping districts and make them more attractive. It must be considered desirable by pedestrians, motorists, and business people for only then can it operate with any sort of efficiency.

Pedestrians have little patience and balk at waiting at street intersections until the lights are turned in their favor. When the time allowed to vehicles is too long, pedestrians jaywalk to save a few seconds. Automobilists have no more desire to wait. Traffic jams only incite them to speed up while the speeding is good. Jaywalking and short speeding spurts are responsible for the largest number of accidents in crowded thoroughfares.

The solution, seemingly, is easy. Don't make the pedestrians wait, and don't make the automobilists stop. The architecture of our modern cities resolves this question into one for the traffic engineer.



Pedestal Signal Installation in Pittsburgh

OUR national capitol, Washington, D. C., has a traffic light system which permits an automobile on 16th Street and Massachusetts Avenue to pass nineteen intersections without a stop providing a speed of 18 miles an hour is maintained during rush hours and a speed of 22 miles an hour is maintained—at other times during the day, and also providing the car starts with the traffic light in its favor.

Although there are some complaints by drivers who are unable to start their cars at the right moment, and who are therefore unable to make the trip through the city in the scheduled time, Col. I. C. Moller, traffic engineer and assistant traffic director of Washington, D. C., points out that since the revised system was put into effect, just a little less than a year ago, there has not been a serious accident in the area which formerly was, from an accident point of view, one of the worst in the District of Columbia. In the two months following the installation of the revised system, there were thirty-five minor accidents, as compared with a record of fifty-one serious and minor accidents for the previous two months, a decrease of 32%.

Perfection is not a condition which is easily achieved. The Washington Traffic Division makes no boasts that it has the perfect system. But compared with the original synchronized light control which was installed in the capitol city in November, 1926, the present installation appears more than favorable.

After nine months of operation, the results have been so satisfactory that an extensive program is being worked out for electric traffic signals on all of the main arteries of travel, and says Col. Moller, "It is believed that the accident record will be very materially decreased when this installation has been completed."

The present Washington system was evolved after experience had shown what should be done. There was little working out of the difficulties with paper and pencil, as the Chicago planners did. One traffic light was installed in Washington to decide whether the control was practical. Later, the 16th Street and Massachusetts Avenue lights were erected. But the synchronized system did not prove satisfactory. Due to the large volume of traffic on three cross streets, the timing had to be set at 1½ minutes in each direction. As has always been found true, in such cases, the automobile drivers, once given the signal to go, proceed at a high speed in order to pass as many lights as possible before being stopped again, and numerous accidents resulted.

Experiments were carried on in the city between 1 a. m. and 3 a. m., when the traffic was lightest, with the

Denver, Colorado, Installation. Four two-way signals per intersection. Cities of the Larger Size Invariably Have Some Mechanical Method of Traffic Control, and the Idea has Succeeded So Well that Even in Smaller Villages Where Tourist Travel Congests the Streets on Week Ends the Stop and Go Signals Have Become Imperative

timing reduced to 35 seconds in each direction. An automobile could travel at a speed of 22 miles an hour through the city, by the simple means of reversing the red and green lenses on certain signals so that the driver, if he kept at the given speed, was always faced by a green light.

ONE of the most effective ways of keeping traffic in order, however, is the use of the amber light. In Washington the cycle of lights is green, amber, red, green. If, for example, traffic is passing on the side street, five seconds before the red light is flashed the amber light appears. Automobile drivers and pedestrians know that they have only a few more seconds, and the automobiles start to slow up, while the pedestrians rush to make the sidewalk before the red light is flashed. But when the traffic again starts there is no amber light after the red light. It has been found that too many people anticipate the green light when the amber light is used, and start to cross the street before the signal has been given. The Washington traffic department feel that the amber lights have avoided many accidents, both vehicular and personal.

Bracket Signal Installation in Waterbury. Dangerous Jogs Often Menace the Public Even More than Intersections of Busy Streets

The fire signal in Washington consists of an amber and red light displayed simultaneously in all directions, as a flashing signal operated at approximately 30 flashes per minute. All traffic is required to clear the intersections and to come to a standstill.

There are three signal zones in the capitol city. The controlling apparatus is located in a convenient fire house, and at each of these controlling points an operator is continually on duty to operate the fire signal or in cases of emergency to throw the switch changing the control from automatic to manual.

Right and left turns have been arranged satisfactorily by the Washington traffic experts. Col. Moller describes the situation thus:

Right-hand turns are always dangerous, because vehicles are obliged to pass over two crosswalks and necessarily cut through the line of pedestrians walking with the proper signal. In Washington all right turns are made when confronted by a green light, in order that the turning vehicle will not encounter any line of moving traffic. Left turns are less dangerous, because they can be controlled, and the vehicle only passes over one crosswalk at a time when no pedestrian has a right to be there. They should, however, be eliminated wherever possible at intersections where two-way traffic is permitted on both, as under this condition they tend to cause congestion. In Washington at intersections of this type the driver desiring to make a left-hand turn keeps as far to the right as possible, and when confronted by a green light pulls across the intersecting street and stops, leaving ample space for through traffic to pass on his left. When the signal changes the turning movement is completed.

At points where a two-way street intersects a one-way street, the driver wishing to make a left-hand turn stops at the right-hand curb, just at the crosswalk line, and when the signal changes to red, stopping through traffic on the two-way street, the turn is completed. Vehicles moving on the one-way street make the left-hand turn into the two-way street when running on a green signal.

The synchronized electric traffic control system, which failed in Washington, is still used by many of the largest cities in the country, including New York. Popularly, it is known as the "stop and dash" system, for after the stop there is a dash by automobilists anxious to get by the greatest number of traffic lights. It provides an interesting race against time for sporting drivers, and the game is entered into with considerable relish by a great many men and women.

UNDER the synchronized system, all the green lights burn along the controlled avenue or street at the same time, while traffic is tied up on the cross streets. Cleveland, with a population of approximately 1,000,000 and 100,000 automobiles in the city, uses the "stop and dash" plan. The signals operate on Euclid Avenue and control the avenue and approximately nine intersections eastward by an automatic regulator at Euclid Avenue and East Ninth Street. The lights on the avenue burn for a predetermined period, which is approximately 90 seconds. Then the lights show amber, for something like four seconds before the traffic on the side streets are given the signal to go. The cross-street traffic is flashed off at the end of approximately 40 seconds, when the amber lights are again shown, and the cycle begins over.

If special conditions at any intersection make it necessary for the traffic policeman on duty to depart from the light system and to personally regulate traffic at his corner, he is able to do so, and provision is made for such a contingency.

Altogether, this system has not proven any too popular. East Cleveland, a sister city, is at present installing a traffic control system, but of a more elastic type.

Originally the city of Cincinnati also used a synchronized system, but after it had been installed it was so unsatisfactory that a modification was arranged. Technically the system now used is known as "staggered synchronized." Along the controlled streets alternate lights are red and green. These change at the same time, so that lights which were green become red, and vice versa. Here again drivers who know how to time themselves are supposed to be able to go through the city without a stop. And although this is not generally achieved, traffic is moving through congested areas with considerably more facility than it did a few years back. Cincinnati's business district has, for the most part, narrow streets which are used for one-way traffic.

THERE are approximately 50 intersections controlled by the traffic lights. Some flexiblity of the system is guaranteed by the division of the district into three zones, each

(*Continued on page 28*)

Business Outlook for 1927

Survey of the Factors Which Will Determine the Financial Trend of the Next Eleven Months

By RICHARD S. CONWAY
Former Vice-Pres. Brookmire Economic

IT IS traditional that a prophet is without honor in his own country. Whether his honorable compensation comes in some other country or from the inward satisfaction of prevision attained is debatable. On the basis of forfeiture of honor, there must exist a host of people sans esteem within the bounds of these United States For this is the open season for the prophet. His voice has been and still is being heard throughout the land and it has spoken through a multitude of tongues. Moreover, in spite of the common opinion, the profession must have its rewards, for each year the number has increased and multiplied. For 1927, literally thousands of prognosticators have broadcast their predictions, the latter ranging in hue from the rosy zenith of optimism to the indigo nadir of depression.

With this immense amount and variety of prophecy already on the market, to offer one more prediction would seem gratuitous. So we shall not call it a prediction. We shall label it an estimate of the probabilities for the present year. With such a designation we escape the odium which falls on the prophet whose prophecies are contradicted by the event. An estimate is only an estimate, but a prophecy has the finality of doom and looks extremely absurd when the doom does not arrive on schedule.

AN estimate is justified, moreover, by the very nature of man. He is a forward-looking animal. Whether he sells peanuts or bridges, he is interested primarily in the future. For the present and past he has regard only in so far as they throw some light upon the future. This estimate, therefore, will follow the universal trait. It will be based upon what has and is happening in the business world and what such events are reasonably indicating.

The first point to be emphasized is that because a new year is starting, a new era in business is not beginning. This year is merely another chapter to be added and its incident and plot will be determined by the many chapters which have preceded it. The most immediate influence upon its character is of course the events of the year 1926. This latter can well be labeled a record year. A mass of data could be presented in proof. Such figures, however, are but dry reading and make but a somber reproduction of a vivid picture of prosperity. It can safely be said that there has probably been no other year in which well-being was so generally diffused among all ranks of the population.

More important than the fact are the reasons thereof. In the present status and trend of these causes lies the basis for a reasonable estimate of the probabilities of 1927. They may briefly be summarized as follows:

1. We have an unparalleled amount of money in this country generously distributed between capital and labor, with a banking mechanism capable of making that money function in a highly efficient manner.

2. With plenty of money to spend, we have been spending it and we have improved the immediate efficiency of our buying power through the widespread use of instalment selling.

3. This general prosperity has enabled us dramatically to make up the post-war housing deficiency through a spectacular building boom.

4. In spite of active buying, general prices have not risen. A war inheritance of enlarged productive capacity plus increased efficiency in its employment has rendered inevitable an emphasis on volume rather than price.

5. An amazing efficiency in the transportation system of the country

Business Outlook for 1927

(Continued from preceding page)

has contributed materially to this price stability.

6. Up to the present crop year, the one major sore spot in the economic complexion of the country, namely, farming, has been showing slow but steady improvement.

7. Increasing stability and continuing improvement in foreign countries have resulted in good demand both for our raw materials and finished products.

THIS is a brief outline of the main forces behind our high prosperity. What will happen during 1927 will have its inception in their developments. At this point it is necessary to step out of the fairly safe road of analysis into the rather thorny one of prediction. Such an excursion, however, is only justified to the extent of drawing reasonable conclusions from the present position and trend of the main causes behind current well-being.

The money factor can be dismissed with a word. Nothing short of war or similar catastrophe is going to put a strain on the credit situation in any very near future. To the extent that ease of credit can stimulate business or check recession, such ease can be taken for granted. Likewise, there is no immediate possibility of materially lessened ease of transportation conditions. Farm income this crop year will be less than in the preceding crop year for the first time since 1921-1922, due chiefly to low cotton prices. The decrease in total farm income, however, is only about five per cent, and while farm buying power in the South has been hurt, that of all farmers has not decreased enough vitally to affect general business.

Whatever serious threat there may be to the present level of business will come from one of the other factors, namely, from a let-up in the building boom, from the evils in the instalment selling system, from our present methods of production, or from foreign competition. After all these are sifted, however, it is hard to see where any evil which they may inject into the situation is going to be tremendously detrimental, at least during the first half of 1927.

A GOOD part of the last three years of prosperity has had its basis in the tremendous volume of building. At the present time, there are some evidences that building is beginning to slow up, in so far as projects contemplated are concerned. The warnings of one very prominent real estate mortgage house recently and the rent situation in most of the cities of the country are an indication that the building boom has probably passed its peak. But buildings are not put up simultaneously with the announcement of a project. Their construction lasts over a longer period. The demands they make on other industries for materials, and the contributions they make to the wage fund continue long after the project is started. The volume of building at present commencing and still in prospect is a sufficient warranty that for many months, at least, the well-being of the country will be added to by the activity of the construction industry.

THE PROSPECT

"ON THE whole, the outlook is reasonably rosy. Taking everything into consideration, it is highly probable that business developments this year will not be thrilling, but there is every prospect that they will be of the comfortable type. Total volume of business moving looks now as though it would be smaller than last year's record output, but 'somewhat smaller' would still leave it in a highly satisfactory condition."

We have at the present time in this country, a highly efficient palnt. It can turn out a lot of production and turn it out a lot cheaper. The volume which it has been turning out has been much added to by the system of instalment selling. The trouble with it is that to make profits, it has to operate at or close to capacity and in doing that it injects an element of competition into the situation which has a serious effect on unit profits. The automobile industry is an instance in point. It has a large and highly efficient plant which has been aided probably more than any other single industry by instalment selling.

The competitive situation has become extremely acute and unit margins of profit have been limited. But even in industries similar to this the demand for their goods remains close to record levels. While this situation would undoubtedly bring a serious crash if buying power should fall off to any extent, there is little indication of such an eventuality right now. The market in many industries has been so exploited that there may be a tapering off, but no crash is yet in view. The same may be said for instalment buying. In many cases it has been pushed to absurd lengths, but the real harm will come when purchasing power is suddenly curtailed, and not in the immediate future.

EVENTUALLY, we are going to meet with a very decided competitive effort from foreign countries. The road to recovery, however, for most of them is still long. In the future, our normal situation will be that of an importing country. We cannot avoid that because of our credit position. It is in the transition stage that the keenest effects of foreign competition will be felt. While it is going to grow this year undoubtedly, it is hard to see how it is going to be very much of a menace in the next seven or eight months.

On the whole, the outlook is reasonably rosy. Taking everything into consideration, it is highly probable that business developments this year will not be thrilling, but there is every prospect that they will be of the comfortable type. Total volume of business moving looks now as though it will be somewhat smaller than last year's record outputs, but somewhat smaller would still leave it in a highly satisfactory condition.

It is probably reasonable to say that when 1927 is completed, the average man will admit that it has been a good business year, but not a sensational one.

Kansas Code Bill

THE Kansas Insurance Code Bill, prepared in accordance with the recommendations of the report of the Kansas Insurance Commission, appointed in accordance with the requirements of chapter 188 of the session laws of 1925, was passed by the State Senate, substantially as recommended by the Commission.

This bill, if adopted, will reduce the insurance laws of the state by nearly 100 sections, and it is expected that the code, if adopted, will be usable for many years to come.

The committee in charge of this activity was headed by the Commissioner of Insurance, William R. Baker as Chairman, John R. Thorne, H. K. Lindsley, E. R. Sloan and Douglas Hudson.

"Your Name Goes On This Line!"

Being the SIXTH and FINAL Article of a SERIES OF SIX Which Have Appeared in Consecutive Numbers of The Journal of American Insurance and Were Especially Written for This Journal

By CHARLES HENRY MACKINTOSH

ABILITY of a salesman may be measured by the number of contracts he CLOSES, and in no other way. He may be an expert at "crashing the gate" and getting in to see his prospect; he may be able to take a solid hour of the prospect's time telling his tale; but if he emerges too often at the end of such interviews with "call-backs" instead of with contracts, he cannot yet claim to be an expert salesman.

The "call-back" is the curse of insurance salesmanship. It wastes more time and kills more business than all other causes combined. He is a wise insurance salesman who decides early in his career that while he *will* make call-backs when they are absolutely unavoidable, he will make very sure that they really *are* unavoidable before he accepts them.

IN support of this conclusion it must be realized first of all that thousands of easy-going prospects regularly rely upon casual "call-backs" to enable them to break away from importunate salesmen. It is so much more satisfactory to give an indefinite call-back—"See me again some time next month!"—than it is to give an outright "NO!" because salesmen have an acquired habit of *arguing* against a "NO!" while they are usually all too eager to accept a call-back. A call-back based upon that state of mind usually means merely that the prospect hasn't even been carried to the point of genuine interest by the salesman's story; and it may be laid down almost as an axiom that call-backs which come *before* the demonstration is completed are of that character. They are not encouraging, nor are they to be counted upon as the first step to a sale. They are really *warnings* to the thoughtful salesman that his demonstration is not yet vital or personal enough and that he will have to do a lot more work upon it before presenting it to other prospects.

Even call-backs

Every time a prospect puts his John Hancock on the dotted line he is endorsing the salesman's diploma as a graduate SALESMAN; because, after all, closing IS Selling, and the man who can't close has no real right to term himself a salesman, since a salesman is merely a man who CLOSES sales.

which come at the conclusion of a demonstration are not to be accepted too readily as having any sound basis in sales-practice, however; because it must be realized that there is another and enormous class of prospects whose chief difficulty consists in coming to a *decision* on any matter involving personal expenditures of trouble or money. Such prospects will listen and agree, but how they do hate to ACT! Because it is so hard for them to "make up their minds" and because they do so greatly dread committing themselves to an irrevocable decision, they are peculiarly apt to fall back upon the call-back as the key to the dilemma. They are convinced, but they don't want to close:—what more logical, then, than to ask for time in which to "think it over"?

SUCH call-backs, of the "want to think it over" variety, are usually given with every appearance of sincerity and of deliberate decision, and therein lies the great danger of accepting and acting upon them. The salesman must realize that it is many times easier for the hesitant prospect to decide to think it over than it is for him to decide to put it over, and since he hates to decide anything, he is far more likely to decide in the way which commits him to nothing. Yet, if the salesman accepts this sterile "decision" and arranges to call back even at a specified time and date, he has actually accomplished a little less than nothing, since he has merely made it harder for himself to close at the end of the second interview than it would have been to close at the end of the one in which he accepted the call-back.

There is a very real and definite reason for this:—the prospect who hates to decide is always naturally looking for reasons why he shouldn't rather than for reasons why he should. In the presence of the salesman, whatever negative reasons he may think up are likely to be controverted on the spot with additional affirmative evidence from the salesman; but if the prospect can get the salesman out of his presence before he continues to think up reasons for *not* doing what the salesman wants him to do, there will be no possible opportunity to break down his barricades, and so he may safely and securely decide definitely NOT to go ahead with the proposition at all. Then, when the salesman calls back, he is faced with a *definite* negative decision—for it is always easier to d e c i d e *not* to do a thing than it is to decide to do it—and now the prospect is in the position of *defending* his own *d e c i s i o n* against any additional arguments the salesman may bring up. It is hard enough to *get* a decision from this type of p r o s p e c t, but to *change* a negative decision into an affirmative one is just a few millimeters away from being an absolute impossibility. Thus, by

Salesmen Save Their Own and Their Customers' Time by Not Accenting too Readily When Asked to Leave and Call Another Day

failing to press the procrastinating prospect to a definite close at the first interview, the salesman has succeeded simply in losing all chance to close him in addition to wasting an extra hour or so of his own time.

IT is true that there are prospects who give call-backs neither because it is a painless method of breaking away, nor because they cannot make up their minds, but because they really *believe* that they want to think it over. Even such call-backs must not be encouraged, however; nor will they be by the insurance salesman who will consider carefully the following facts:—What *happens* when a prospect, even one of the conscientious class, is left alone to "think over" a proposition put before him by a salesman? Does he immediately settle down to recall the arguments and proofs presented by the salesman, and to consider each carefully and in logical sequence? In ninety-nine cases out of a hundred he does nothing of the sort, but returns at once to the contemplation of whatever he was doing when the salesman interrupted him. If he was doing nothing in particular, the chances are strongly in favor of something having come up during the course of the interview. Perhaps there is another salesman waiting to present another or even a rival proposition; or there may be a customer, or a prospect of his own to be interviewed. If not any of these, then perhaps his dictation is ready to be read and signed; but there is almost sure to be something which will prove more intriguing to him than to continue to weary his mind with what it has been considering for the last half-hour or more. Thus the inevitable tendency of the prospect is to push the proposition into an unoccupied corner of his subconsciousness while he concentrates his conscious attention upon something more urgent, more vital to his immediate interests, or simply more interesting to him as a relief from too much concentration upon that particular proposition. It may be the next day, or even two or three days later, before he gets a good opportunity, or feels the urge, to settle down and "think over" what the salesman said.

NOW not many men could listen to an after-luncheon talker expound a somewhat involved proposition in anything from twenty to sixty minutes of condensed conversation, and, next day attempt to set down even an approximation of his points and phrases and proofs. Yet that is almost exactly what the prospect is requiring of himself in the case in point. He has listened just once to a carefully constructed and condensed demonstration in which each point appeared in the proper order to lead logically to the next, and every point of a controversial nature was clinched at the time it was presented with proof which may have and probably did take the form of documents produced from the salesman's kit and returned to it again after the proof was made. What likelihood is there that the

prospect can remember even one-third of all the salesman said, to say nothing of remembering it in the right order, or of recalling and re-visualizing the tangible proof which went away in the salesman's brief-case?

As a matter of fact, the prospect remembers at most only the general outline of the demonstration, and when he settles down to think about it, the first thing which will inevitably come up in his mind is that point upon which he was and is most doubtful. It is only natural that this should be so, because what we really *think* about always makes a much deeper impression upon our minds than what we merely *hear*. In listening to the salesman, the prospect merely *heard* the points to which he took no exception, and so did not fix them firmly in his mind; but those points which were not quite *convincing* to him were the very ones about which he did some *thinking* at the time. He may even have formulated

questions about them, and the salesman may have answered the questions convincingly enough at the time, perhaps with documents produced from and restored to his brief-case; but now those documents are not present, and what the salesman said is not nearly so clear-cut in the prospect's mind as what he himself said or thought.

WHAT is even worse for the salesman's chances, it is evident that the very point upon which the prospect was *most* doubtful will be the one upon which he concentrated his attention most, and so it will inevitably be the *first* to come up for consideration when he thinks the proposition over privately. He remembers all his own objections very clearly, and he remembers some of the salesman's answers, but not so clearly. What wonder, then, that prospects who are permitted to think a proposition over under such inevitable conditions come to two dangerous decisions:—first, that they will *not* go ahead with the proposition; and, second, that they were and will be wise to decline to decide on *any* proposition in the presence of the salesman, because they have just had another experience of the fact that no proposition appears anything like as good when one thinks it over alone as it did when the salesman presented it. The prospect may even wonder whether "hypnotism" has anything to do with that invariable fact; while the real reason, of course, lies in the incapacity of the human mind to *recall* the proposition as it was originally presented.

The conclusion to which one is inevitably driven by all these considerations of what are actually psychological FACTS (open to experimental verification) on all three basic types of "think-it-over" call-backs, is that in all such cases the salesman who fails to close at the end of the *first* interview has thrown away his chances and his time.

WELL, how *can* he close such prospects in one interview. The answer is implied in the analysis which has just been made. The first kind of call-back came because the prospect had never been brought to the point of keen interest in the proposition. The way to avoid that kind of call-back, then, is to *bring* him to

(Continued on page 29)

"I'm Not Supposed to Take the Welfare of Private Enterprises Into Consideration When Making Preliminary Surveys," Bluntly Retorted Lodge.

Why the Road Went North

By HUGH PENDEXTER

Author of "Kings of the Missouri," "Red Belts," Etc.

"HOW many preliminary lines have ye run?" cunningly asked McIntosh, tilting his shrewd old head and eyeing Lodge closely. "Four," was the prompt answer. "The locating party in the spring will locate the one south of the lake."

"You're sure the Winnipeg office will order that?" asked the Scotchman, bending and trifling with the draft of the Sibley heater; for although the Indian Summer had just waned, the air was chill with threatening snow, and inside the tent, without heat, was colder than the sunlight.

"They'll naturally follow their engineer's report," returned Lodge, exhibiting some surprise at the query. "Why do you ask?"

McIntosh leaned back and half closed his eyes and slowly explained, "I want the road to run north of Hockomock."

The engineer winced and betrayed some anxiety as he earnestly retorted, "But the line south of the lake is cheaper. Of course, I have nothing to say as to which line the locating party will be told to follow. My work's done when I submit my reports to the Winnipeg office."

"And why can't your reports favor the northern line?" calmly demanded the Scotchman.

LODGE flushed and for a moment looked embarrassed; then his gaze flickered with anger as he coldly answered, "I've already told you. The southern line is the cheaper, therefore the logical route. My employers aren't building railroads for their health or as a diversion."

Bruce McIntosh, a power in the Dominion and already several times a millionaire through his investments in the country, studied Lodge sharply for a few seconds. He had hoped the young man would be more complaisant, but mere resistance to his will was only an obstacle to overcome, and he gathered himself with the old tingle of joy as he recognized opposition. His trip to the north of Hockomock Lake at the foot of the mountain of the same name had been planned expressly for the purpose of winning the young engineer over to his way of scheming. The camping party besides the guide included two well-known capitalists from the States, bold men who would plunge to the tune of millions without turning a hair, and Miss Mary McIntosh. It was because of Miss McIntosh's presence that Lodge had dropped his work fifty miles south and joyously accepted the invitation to spend a week in camp. Up to the moment of this interview he had never suspected the Scotchman as possessing any ulterior designs, but now that the shadow of a doubt crept into his open mind he felt as if doused with water.

AS HE finished his rather stiff answer and as his host continued inventorying him he began to remember that the camp stood in the heart of one of the noblest stands of timber in all British Columbia. The region lacked only transportation facilities. If he had indorsed the line north of the lake it would top the McIntosh holdings and enrich the Scot and his friends many hundred per cent. Incidentally, it would recommend him to the good opinion of the capitalist.

McIntosh was now speaking, dropping a bit into the dialect as he slowly summoned his power of logic and persuasion to justify his request. "I've kenned this country a vera long time. I ken weel the route the preliminary survey seems to favor; but I ken the route north o' Hockomock is more feasible and is the one Winnipeg should be told to follow."

There was a new edge to the Scotchman's voice, although he endeavored to speak gently as he said: "The initial cost of road building isn't the prime factor always that we should consider. Ye ken that. If your only purpose was to get somewhere, regardless of what region ye opened up, it would be best to strike the head of the Fraser, follow it for grade, and tap the C. P. at Westminster. But there's a bigger and more consequential object in putting through a road when you're crossing virgin country. That's resources. Whatever trifling extra cost the northern line might cause is more than offset by the natural resources of the country."

"I'M NOT supposed to take the welfare of private enterprises into consideration when making the preliminary surveys," bluntly retorted Lodge. "I simply report to the Winnipeg office as to the routes. My figures speak for themselves. If you, or any other gentleman, wish to lay any proposition before the road's officials, it's perfectly proper for you to do so. The line can't be changed."

"There Was Handsome Power in the Level Eyes and Clean-Cut Face"

"That's final?"

"Absolutely."

"Ill bid ye a vera good-day, Mr. Lodge. I ken ye'll be going south soon." And the Scot's voice was deadly cold.

Lodge's tanned face burned a deep copper as he heard his dismissal. For the first time he fully realized his company had been sought that his conscience might be debauched. And he though of Mary McIntosh. Could it be possible she was knowing to her father's purpose? The suspicion sickened him. After ten years of roughing it, with but few women to remind him of home, this clear-eyed girl, fresh from civilization, had been a miracle to him. It had seemed a wonderful thing that throughout his week's stay in the camp she should have shown a deep interest in his work and should have insisted that he talk much about himself. He couldn't understand how his fight with the primitive could spell romance to her hardy spirit. He had forgotten she was the daughter of her father.

"I'm quitting at once," he informed, rising and backing from the tent. McIntosh was busy feeding wood to the heater and ignored him. With despair filling his heart he left the tent and made for his own quarters, humiliated in pride. Blazes, the breed guide, and young Dally, son of one of the capitalists, were playing poker for cigarettes, in front of his sleeping quarters.

"Say, Lodge, the Siwash is trimming me most everlastingly. Do you suppose he plays fair?" complained the youth and pointing at the parapet of white tubes before the guide.

IF LODGE gave any reply he was not conscious of it. His only desire was to get away, to win clear of the place where he could breathe free and feel clean. A few seconds sufficed to roll up his Hudson Bay blankets and rabbitskin robe. Then the pack was slung on his back, and snatching up his rifle he was about to depart, when voices from the next tent reached his ears.

He had no desire to play the eavesdropper, but he was compelled to heed Dally, Sr.'s strong, confident voice telling MacCromb, the second magnate, "It's a cinch. McIntosh is taking his measure now. Everything's cooked and ready to serve. Trust the Scotchman to get the chestnuts out of the fire without burning his paws. His terms to us are rather high, but it's like finding money."

"I never like a scheme that depends on one man," protested MacCromb. "Strikes me you're too cursed sure the line can be changed."

"This Clear-Eyed Girl Fresh From Civilization Had Been a Miracle to Him"

"I'll bet you ten to one and you name the limit," laughed Dally.

"If it wasn't for the girl I'd take you and break you," grimly returned MacCromb. "Everything pivots on her—another thing I don't like. Never make a deal where a woman is the hinge to swing it on."

TEN years of roughing it with rough men destroys one's respect for the artificial in life, and Lodge was filled with hate and despair as he struck into the south trail. Bah! It was sickening. And yet she was Mary McIntosh. The air was filled with frost and snow was on its way, but his blood ran hotly and his forehead was sticky with sweat as he strode along. If he could only make the lake—never see her again. Then the bottom seemed to drop out of his soul as he concluded this wild wish; for he had builded his whole future on the theory of always having Mary McIntosh participate in his success. Not to see her again—

"Where's the wild man hurrying to with head bowed and his brows crawling into naughty frowns like angry caterpillars?" her calm voice broke in.

He came to a stumbling halt and jerked up his head. She was seated

Why the Road Went North

(*Continued from preceding page*)

on an uprooted tree, sketching, her fingers showing red from the cold. In her blue eyes danced many questions.

"I'm going back to work," he hoarsely answered, gazing at her sadly.

"An informal leave-taking," she lightly murmured, rising and moving into the trail. "Everyone is informal up in this region. I wish you luck."

"Thanks." He tried to think of something to say. He could not tell her that her father had sought to buy him. She either knew and would be unashamed at hearing him, or she must never know. No; he could not tell her that. Besides, he wanted to try and think she did not know. As he paused, tongued-tied, her gaze hardened and he interpreted her expression as evincing contempt. The belief stung him and, straightening, he quietly added, "Your guide knows his business, I assume. But remind him the steamer makes its last trip for the season on the seventh day from now. Snow's coming; to miss the boat might mean fearful hardships."

"Possibly you're afraid of being caught by the first flurry of snow and want to get out while it's safe traveling," she innocently observed, but with no softening of her eyes.

"Yes, I'm afraid," he sadly assented. "Have it that way, Miss McIntosh. But I shan't wait for the boat. I shall cruise round the lake and make the line afoot."

Before he could fully realize the break between them he was hastening blindly down the trail, while she had disappeared in the direction of the camp.

WITH a muttered exclamation of triumph Lodge painfully limped toward the opening, through which he obtained his first glimpse of the gray waters of Hockomock. For three days he had been forced to lie up under a lean-to, nursing a badly wrenched ankle. Three days more he had used in making the lake, often compelled to pause and shoot some feathered game as his pack was nearly exhausted. Half starved and weighed down by fear the steamer would pass the head of the lake before he could make the shore, he had stuck to the trail with his right foot practically out of commission. By will power he had covered the distance, and it was the seventh day since he had quit the McIntosh party, intending to cruise the entire fifty miles afoot. That plan was entirely out of the question now, and it was a gamble whether or not the boat had come and gone. He dreaded to find himself face to face with her on the boat, and yet the probability thrilled him.

Throwing aside his blankets he stared anxiously down the long stretch of leaden waters. The clouds hung low and were spitting a flurry of snow, and his imagination played him queer tricks.

As he gazed, striving to reorganize his nerves, he suddenly leaped from the rock, and with a low cry of incredulity fell to his knees, for the moment forgetful of the stabbing pain through his foot. The imprints of a shoe made toward him and then circled back, and vanished as the wanderer regained the bare, brown floor of the forest. It was the size of the track that first startled him, so small and so entirely different from the moccasin impress left by any Indian woman. Nor did the traces conform to the characteristic traces left by a squaw. It was the trail of a neatly booted white woman. But why was it here and why did it swing so meaninglessly to the shore and then retreat to the cover of the woods?"

"Logic, logic, old man," he commanded as he regained the mastery of his mind. "Why should she come here—whoever she may be? Why am I here? She came to see if the steamer was in sight! This snow fell since early morning. She came recently or the tracks would be obliterated. What white woman—for white she is, I'll swear—would be cruising round these parts, and alone? Good heavens! It can't be."

"ENGLISH FIRE INSURANCE"

IN THEORY AND IN PRACTICE
BY
RICHARD MORRIS
WILL BE THE THEME OF THIS NOTED CONTRIBUTOR'S NEXT ARTICLE

ABANDONING his blankets and retaining only his rifle, he limped in pursuit of the trail till it became lost under the fir and spruce. Then he halted and took stock of his own predicament. To follow the tracks might—probably would—cause him to miss the boat. That spelled a fifty-mile tramp through a rough country, through woods and windfalls, in zero weather, and with a crippled foot. He would have no guarantee of food.

It seemed as though he had been cruising for hours, whereas it was but some thirty minutes, when he caught the acrid odor of wood ashes. Testing the air critically he advanced more slowly and was at last rewarded by the faint sound of voices. Setting up a cry he quickened his pace and was at once answered by a clear, ringing call. No one but a woman could have sounded that note, and his heart tightened as he believed he had identified her. Then he broke through the last barrier of undergrowth and saw her. She was standing before a low shelter, built of poles and brush, her fair face turned toward him, her grave eyes aflame with anxiety.

"Mr. Lodge!" she exclaimed as he advanced.

"Miss McIntosh!" he cried. "What's the matter? Why are you here alone?"

"I'm not alone," she replied. "We've met with misfortunes. The guide was badly wounded by a bear. Mr. Dally, Jr., is ill. I fear it may be pneumonia. His father is half mad through distraction. The food gave out yesterday. Father and Mr. MacCromb are very weak, although they've borne up bravely. Mr. MacCromb gave out last night. Father tried to accompany me to the lake, but was too weak. Has the steamer come?"

"I don't know," he answered, limping to the lean-to.

"You're hurt," she softly said, stretching out a hand to assist him.

"A bit of bad luck," he mumbled, bending before the low opening.

YOUNG DALLY, flushed with fever, was stretched out on a bed of fir boughs, his frightened father huddled up at his side. Nearby was the breed, his Indian stoicism repressing any show of suffering, although his lips were bleeding where he had bitten them. McIntosh had his blanket pulled up over his head, apparently prostrated by their calamity. MacCromb lay on his back, his eyes staring foolishly at the slanting roof. None of the men seemed to sense Lodge's arrival.

"Where's your equipment?" cried

Lodge as the girl kneeled beside him. "Why haven't you a fire burning?"

"We abandoned everything yesterday when we ran out of food," she wearily replied. "We haven't any matches. The men had all they could do to get the Indian and young Dally this far. They lugged the Indian in a litter. Young Dally managed to walk part of the way. I helped his father carry him when he gave out. Then I built this shelter—not very good, but the best I could do."

"You're a brave little woman," he softly said, as he gently turned back the Indian's mackinaw and opened the hunting shirt.

"Mist-a-ya makeum hurt," murmured the Indian.

Lodge winced as he beheld the long cruel slashes that enveloped one-half of the guide's body. "Me killum," proudly added the guide.

"Good work, Blazes," applauded Lodge, deftly removing the clumsy bandages and refashioning them. Although the grizzly had slashed the guide's back and one side to ribbons, a more careful examination told Lodge that he would survive, provided he could be taken to the foot of the lake, where the surveying party could give him adequate treatment. A white man would have had a scant show; the Indian would win out.

"Blazes urged us to cut off some of the meat," shuddered the girl; "but it was all so terrible—their fight—that we hurried away as soon as we could make a litter."

"How far are we from the lake?" asked Lodge, rising and gaining the open.

"A long distance." she sighed.

"Walkum one mile," corrected the guide, his small eyes lighting as he scented the possibility of winning clear to the steamer.

LODGE shook the Scotchman by the shoulder. McIntosh had been dozing and was unable at first to understand the situation. When he spoke it was to ask, "What are ye back for?"

"To get you people out," cried Lodge. "Crawl out and help Dally carry the boy to the lake. It's a mile. MacCromb and I will take care of the guide."

"Father isn't able. I'll help with the litter," promptly offered the maid.

"You'll reach the lake at top speed and build a fire and hold the boat if it comes before we arrive," sharply corrected Lodge. "You're the swiftest-footed one here. Take these matches and run for our lives. Follow the trail you made today. Be off!"

She hesitated as though to contend the point. Then as his stern eyes caused her gaze to waver she surrendered and started nimbly through the woods. Her last glimpse of the camp was to see Lodge shaking MacCromb and Dally roughly, while her father dragged a rough litter from behind the lean-to.

The mile soon sped beneath her anxious feet, and she cried out loudly in triumph as she gained the shore and beheld the steamer nearly abreast of her but hugging the opposite shore. From the birches she wrenched strips of bark and lighted the pile. On the red mass she heaped the dead limbs of fir and spruce until a shaft of flame leaped high toward the gray canopy. The snow had ceased, leaving a gray world. The waters, the signal fire alone stabbing the monotony and dreariness with its crackling flames. The steamer worked slowly up the lake and then turned, and for a few minutes headed for her and the fire. Now the danger was over she felt weak and inclined to tears. Before she could indulge in this emotion she was horrified to see the bow of the boat swing about until she was headed down the lake.

"We're left! We're left!" she shrieked, sinking beside the fire, covering her face with her hands.

A man's voice snarling out an oath caused her to lift her head. Lodge, limping fearfully, was breaking from cover, his right hand shaking the rifle at the steamer.

"They've left us!" she wailed.

HE DID not heed her, but fastened his glaring eyes on the boat while he discharged three shots at the heavens, the reports almost blending into one. Both man and woman saw several figures near the pilot house leaning over the rail and gazing curiously in their direction.

"That'll fetch 'em!" he panted. "They didn't understand your signal. They thought it was some Indian camp. They'll turn in now."

"But they don't! They don't!" was her agonized cry.

Shading his eyes, Lodge scanned the steamer closely. She had not altered her course.

"Damn 'em!" he passionately gritted, dropping to one knee and taking careful aim. "They'll notice this."

The whip-like crack was instantly followed by signs of activity aboard the steamer. The figures at the rail vanished. The heavy bullet had smashed a hole through the pilot house within six inches of the wheelman's head. Lodge remained motionless, his rifle lined on the pilot, whose head was a dark silhouette through the window.

"Are they turning back?" she whispered.

"Either that or they'll need a new pilot," he ominously returned, pumping a cartridge into the breech. The steamer's nose slowly swung about.

"They're coming in," he quietly assured, rising and dusting the snow from his knees. "I heard your outcry and quit the others to run on ahead and investigate. Lucky for all you gave the alarm."

"Lucky for all of us you came and found us," she sobbed.

He gazed down on her drooping figure hungrily. "I wonder if you can feel anything besides 'just thanks,'" he murmured. "It's the law of the trail to lend a hand. What I've done is for myself as well as for you. You know how I feel, Mary. Do I have a chance? I've had a rare old row with your father. Would that make any difference?"

With two quick dabs she cleared her eyes of tears and smiled whimsically as she reminded, "Dad does as I say outside of business. You weren't referring just now to business, were you?"

"Hardly!" he managed to say.

The wedding took place at Calgary, and McIntosh seemed to be in the best of humor as though hugely pleased with his son-in-law. After the Dallys, father and son, had departed, the last of the wedding guests, the Scotchman said, "I ken ye plan to take Mary to Winnipeg and then to New York on the honeymoon."

"We'll stay in Winnipeg just long enough to settle up the office business; then we're off for the States," joyously assured Lodge. "And next spring I'm going to take time off and go camping with Mary up at Hocko-

(*Continued on page 29*)

CO-INSURANCE

WILL BE
DISCUSSED
IN A
COMING ISSUE
BY
J. J. FITZGERALD
ASSISTANT SECRETARY
GRAIN DEALERS'
NATIONAL MUTUAL FIRE
INSURANCE COMPANY
OF INDIANAPOLIS

Heart Diseases Head Fatality List

AN ANNOUNCEMENT issued by the Bureau of the Census through the Department of Commerce of the United States gives "Diseases of the Heart" as the principal cause of death in the registration area in 1925. Second rank for deadliness was given to nephritis, with pneumonia, cancer, tuberculosis (all forms), and cerebral hemorrhage following in order

Total deaths from heart disease in the registration area (comprising 89.4 per cent of the country), were 191,226 in 1925, and 176,671 in 1924. Nephritis deaths in 1925 were 99,320, and in 1924 were 88,863. Pneumonia, in 1925, was the cause of 96,432 deaths, and in 1924 of 97,403. Cancer and other malignant tumors caused 95,504 deaths in 1925, as compared with 91,138 in 1924. In 1925 tuberculosis deaths were 89,268, a decrease, in numbers, from 1924, with 89,724. Deaths from cerebral hemorrhage and softening of the brain were 87,064 in 1925 and 91,941 in 1924.

Deaths from homicide showed a slight increase, from 8,420 in 1924 to 8,893 in 1925. Influenza deaths increased from 19,374 in 1924 to 30,538 in 1925.

The text of the announcement follows:

The Department of Commerce announces that 1,219,019 deaths occurred in 1925, within the death registration area of continental United States, representing a death rate of 11.8 per 1,000 population—the same as the rate for 1924.

This death registration area in 1925 comprised 40 States, the District of Columbia, and 24 cities in nonregistration States, with a total estimated population on July 1 of 103,108,000, or 89.4 per cent of the estimated population of the United States.

The principal decreases in death rates in 1925 were from measles, from 9 to 2 per 100,000 population; pneumonia, all forms, from 98 to 94, and tuberculosis, all forms, from 90 to 87.

Increases in rates in 1925 were for influenza, from 20 to 30 per 100,000 population; diseases of the heart, from 178 to 186; nephritis, from 90 to 96, and diarrhea and enteritis, under two years, from 28 to 32.

Kansas Tornado Rate Reduction

The superintendent of insurance of the state of Kansas issued an order on January 20th, 1922, effective March 1st, 1922, and confirmed in this respect by the judgment of the District court of Shawnee county on October 24th, 1925, directing a reduction of 10% (ten percent) in the rates for tornado, windstorm and cyclone insurance upon all classes of construction and contents (excepting risks upon dwelling classes, item L, and farm property, item A).

Effective on all policies written on and after January 2nd, 1927 the rates published for tornado, windstorm and cyclone insurance upon all classes of construction and contents (excepting dwellings and other classes described in item L, page 65, of Rule Book; farm property, item A; and hail risks, item O), must be reduced 10% (ten percent).

This does not apply to policies effective prior to January 2nd, 1927, but such policies will be otherwise handled.

Workmen's Compensation

Hon. Wilbur D. Spencer, insurance commissioner of the state of Maine, under date of December 28, 1926, sent out the following opinions:

"The attention of this Department has been directed to the fact that in some occupations where the employer is insured with a casualty company and furnishes the raw material, the operations are performed in the homes of private individuals who do the work without the employer's supervision, and merely return the finished product to the manufacturer for inspection and approval.

"The workman who operates under these conditions assumes a position analogous to that of a private contractor who regulates his own industrial status so far as accidents are concerned and cannot be subjected to the restraints of supervision by his employer or to the restrictions of the Workmen's Compensation Act in case of accident or notice. Such practice opens the door to fraud and is clearly subversive to public policy, when, as in this case, the public has assumed liability for compensable industrial accidents.

"Therefore, it is the opinion of this Department that injuries arising from any employment protected by Workmen's Compensation insurance must be incurred upon the employer's premises or under conditions and observations similar to those where and when the basic rates for such operations were formulated. In all cases, employes should be under such personal supervision of foremen as are required ordinarily for such occupations."

In New Jersey

THE New Jersey State Department of Banking and Insurance has announced the following appointments in the Examination Division of the Insurance Bureau: Assistant Chief Insurance Examiner, Anthony A. McNicholas; Senior Insurance Examiner, George S. Dean; Insurance Examiners, Clinton H. Baker, Frederick A. Hemmer; Junior Insurance Examiner James J. Goodwin.

Annual Statement Blanks

HENRY D. APPLETON, chairman of the committee on blanks, National Convention of Insurance Commissioners, has recently sent out the following letter:

"In order to avoid the possibility of any misunderstanding, I would again call your particular attention to the rule adopted by the Committee on Blanks several years ago to the effect that all changes and amendments to any of the convention editions of Annual Statement Blanks thereafter suggested by recommended must be filed with the Chairman of the Committee not later than March 15th of any year.

"This year suggested changes and amendments should be filed preferably before February 15th and by all means before March 1st, inasmuch as the early meeting of the Executive Committee of the National Convention has necessitated that meeting of the Committee on Blanks begin this year on April 2nd. Any suggested changes and the reasons therefor should be stated in concise but complete form. Twenty-five copies of the suggestions and reasons should be submitted to the Chairman of the Committee on Blanks. But

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The Real George Washington

TWO writers recently have produced books which purport to give the world full-length portraits of the real George Washington. It is the theory of these writers that tradition has created a legendary figure, and that truth demands a dissipation of legend and a reconstruction of the historic personality by the piecing together of all available facts which may be discovered by diligent research.

These portraits are in some measure disillusioning. They disclose a man marked by frailties of character which an admiring nation has been disinclined to associate with his name. They deprive him of something of the glory which has infused his memory in the thought of the American people. Inevitably they lessen in the mind of the reader the reverence in which he has been held as a great, wise and courageous leader.

BUT before we permit our conception of Washington to be affected seriously by these latter-day biographers we should be satisfied that the material from which they fashioned their pictures is indeed authentic. Neither of the writers is a qualified historian; neither has at any time given proof of any peculiar capacity for the scientific assay of historical material. One has been known for years as a writer of fiction, and sometimes of fiction highly colored. To give the view of a real historian, Dr. Albert Bushnell Hart, of Harvard, we quote from a recent statement by that authority:

"I found 297 statements in the book which are absolutely false, and 111 which are extremely doubtful. The book is full of slurs and snarls based on the internal consciousness of the author, and of expressions of the way the author would have acted. It is very plain that he does not know what he is talking about."

WE HAVE seen no such expert critical analysis of the other book, but there is good reason for the intelligent reader to be mentally on guard against the writings of men, possessing no special equipment for the task, who attempt to deal with personalities and events of the past. It is just as well to bear in mind that there is a difference between writing history as history and making "copy" out of history for the sake of titillating the fancy of those who love to be thrilled or shocked.

Unquestionably it is true that legends grow about certain names and events. But that very fact is proof of some unusual quality in the person or the happening, and the picture which is thus presented, although containing elements of the legendary, may well be nearer the truth than the pseudo-historian's patchwork of facts and alleged facts. The collective imagination which builds the legend received its original stimulus, was given its direction and color, through the contemporary living influence of the man. It represents the actual impression made by him upon his time. It is in closer key with the real significance of his character than a picture drawn a century or more later by some busy mind whose curious delvings have unearthed incidents which, in their occurrence, were wholly, or almost wholly, submerged beneath the total greatness of the personality, but now are magnified out of all proportion.

THERE may be a measure of comfort in the knowledge that our national heroes were human beings; that they played and loved and made mistakes. But all of this having been recognized, it remains true that they were also what they have become as sources of influence and inspiration in the life of the country. And this is the important thing.

George Washington commanded the faith and affection of his fellows. His confidence in the great American experiment, his clear vision of the fundamental principles essential to insure its success, his incorruptible devotion to the ideals which he proclaimed—these are the things which are significant for us. A union for mutual welfare and security, in which, to quote him, "all the parts combined in the united mass of means and efforts cannot fail to find greater strength, greater resource, proportionably greater security from external danger," was the objective he sought. It remains the objective of the American people, and it is for that reason we speak of mutual insurance as American insurance.

Security as a Condition of Enterprise

THE constructive enterprises of mankind take place in periods of security from external or accidental danger. The fear of peril diverts the mind from those efforts which make for progress.

The aim of liberty is to release the energies of the individual for the pursuit of welfare and happiness. In America we seek to promote opportunity for individual ambition; we seek to stimulate individual initiative. No American familiar with the traditions of his country or imbued with the spirit of its institutions needs to be told that this is a land in which individual enterprise is cherished as the great factor in national progress and prosperity.

BUT individual enterprise is possible only when individual security is assured; and security is, in its very essence, the result of collective effort. If it be left to each individual to make certain of his own safety wholly through his own power, at once we have a conflict of individuals for dominance, and an end of all real security, all peace, all conditions conducive to constructive effort.

The recognition of mutual interest and mutual obligation in the matter of security is the very basis of individualism. Mutual insurance is the friend of individual enterprise. No voluntary endeavor of citizenship has done more to promote a sturdy, progressive Americanism than this method of freeing energy from the paralyzing fear of hazard.

Life-Lights on a Business Background

February 12, 1809

By S. J. DUNCAN-CLARK

ONE of those big, leaf-for-a-day, calendars hangs over my desk. In figures several inches high it announced that this was "February 12, 1927."

My mind had been turned to memory of Abraham Lincoln as my eye rested upon it while I opened my mail. "A great day in human history was February 12, 1809," I had thought, and recollection carried me back to a day never to be forgotten when I, and hundreds of others had made a pilgrimage over roads deep in spring mud to a sacred spot at Hodgenville, La Rue County, Ky. On the site where stood in 1809 a little log cabin they were that day dedicating a memorial to the man who had there been born, and had there begun the process of self-education which was to release and develop his genius for the mighty service of his fellows.

"Abraham Lincoln," so my thought ran, "did more than save the Union and free the slave. He restored faith in the possibilities of human nature. He proved that when God needs a man to do His work he can be found, and that God often finds him where his fellow men would be least likely to look for him."

IN this fashion I was meditating as I slipped my knife under envelope flaps, scanned a circular, frowned over a bill, laid carefully aside a communication which needed answer. And then my old friend, Walter Spence, came in. I had not seen Walter for several years, and I greeted him cordially. Queer sort of fish he is; scientific type. You may have seen some of his articles on "The Life History of the Acanthias," or "Notes on the Habits of the Lepidosteus," or some other such subjects. I confess I do not read them, but every now and then he sends me a marked copy of a high-brow magazine containing one of his erudite screeds. Once he sent me a book he had written. If he comes out to the house—and I hope he will—I must try to get the pages cut before he discovers it.

Walter's eye fell on the loud-figured calendar.

"A great day in human history—February 12, 1809," he said.

"Exactly what I was thinking when you came in," said I, genuinely pleased that Walter had mind for other things than the strange and unpronounceable objects of his laboratory research. "Abraham Lincoln was a tremendous factor in shaping the life of this country—"

"Abraham Lincoln?" exclaimed Walter. "Ah, yes, I suppose he *was* born on February 12 in that notable year."

"Suppose!" said I. "Of what else in the name of sense were you thinking when you said it was a great day in human history?"

"Why of Charles Darwin, of course. He was born on that day," answered my friend.

Many a Conversation About the More Serious Phases of Life Takes Place in Business Offices During the Moments of Relaxation After the Lunch Hour

"Darwin," I cried, "Darwin—and what did he ever do to make his birthday memorable, except get a fellow named Scopes in trouble and start a monkey show in Dayton, Tenn.?"

WALTER smiled as an indulgent parent might smile upon a foolish child.

"Well, he did a little more than that. He changed the whole course of human thought, and if thought has anything to do with the making of history it follows he had some influence on the course of human events."

"Maybe," I answered petulantly. "I confess I don't know much about Darwin, but he doesn't class with Lincoln as a great human figure."

"I wouldn't say that," my friend demurred. "Both men were great emancipators. Lincoln was a great social emancipator and Darwin a great intellectual emancipator. It had never occurred to me before that both were born on the same day in the same year, but now that my attention is called to it I can only reassert with greater emphasis that February 12, 1809, was a great day in human history."

"And, as I have said, I agree with you—because of Lincoln," I added stubbornly. "I feel that I owe a lot to him; but what do I owe to your friend Darwin?"

"THAT is a story that would take some telling," said Walter. "Judging by the appearance of your desk you have no time to

(*Continued on page 29*)

The Rainfall Hazard

Fundamental Factors Related to This Weather Risk and Their Practical Application to Underwriting

By COLONEL JOHN P. FINLEY
Consulting Meteorologist and Manager National Storm Insurance Bureau New York City

Article III—Rainfall Types

SECOND SECTION.

ILLUSTRATIONS dominate the third article for the very good reason that types are best presented in that manner. The reader and the student must gain a clear and satisfactory mental picture of the characteristics that represent and embody the salient features of a class or group. In the sciences of meteorology and climatology graphic illustration must frequently be adopted to convey information on the subject of atmospheric circulation. The daily weather map of the U. S. Weather Bureau is practically equivalent to a photographic reproduction of the condition of the atmosphere overlying the country at the moment of taking the synchronous observations at over 500 thoroughly equipped stations, by trained observers, reading and consulting their standard instruments at the same moment of actual 75th meridian time.

The elements observed and recorded embrace current, maximum and minimum temperatures, state of weather, barometric pressure, wind direction and force, amount of rain and snow, with rate of fall, kind of clouds and direction of movement, upper and lower clouds, with mist, haze and fog, amount of sunshine, frost, sleet and hail, thunder and lightning, violent local storms; all reported to weather forecasting centers twice daily by wire at the regular 8 A. M. and 8 P. M. hours of observation.

A word painting of these observations could not possibly be, in that form, as comprehensive and effective as their graphic reproduction in the daily weather map. This map shows State boundaries, principal rivers, location and name of all reporting Weather Bureau stations, coastal lines, water areas, all within the area of the United States, and contiguous territory within moderate limits, sufficient for identification.

OUT of this maze of meteorological information we are selecting, for intensive study and discussion, the element of precipitation, in the form of RAINFALL, in its relation to the daily affairs of life. We are delving into the nature of its occurrence and the manner of its distribution, in order that we may find, not only how the atmosphere acts in the production of rain, but what are the probabilities of its occurrence within any unit area.

Our methods of investigating rainfall occurrence and distribution are necessarily empirical and semi-empirical at the outset, but the results attained in this direction must eventually be tested by the application of the thermodynamical laws to the meteorological phenomena that have been observed, recorded and correlated.

COL. FINLEY
WILL CONTINUE
HIS AUTHORITATIVE AND
INFORMING
ARTICLES
ON
"THE RAINFALL HAZARD"
IN SUBSEQUENT ISSUES
OF THE JOURNAL

In a thermodynamical treatment of the atmosphere we begin with the equation for the condition of dry air at a uniform temperature. The introduction of water vapor will make a slight change in the equation, which change will reach a maximum when saturation is attained. At the moment of condensation these equations must be replaced by more complex ones to account for the radical changes incident to the rain, hail and snow stages of the upward convectional circulation of the atmosphere. When precipitation actually commences there is a diminution in the total energy of the air, due to the expansion of upward convection and the change of water vapor by condensation into cloud masses and finally into rain. When the condensed water falls out of the air and during which operation there has been no addition or subtraction of heat, the condition is known as adiabatic. In this situation the entropy, or permanent quality of a body, independent of volume, remains constant while the volume of the air changes. In the event of a small amount of heat entering or leaving the air, the volume is increased or diminished proportionally to this amount, divided by the absolute or potential temperature, the result being termed the "thermodynamical function."

SINCE heat always flows from a higher to a lower temperature, a body that gains heat always gains more entropy than is lost by the body discharging the heat. Hence with every flow of heat the total entropy tends toward a maximum. In the ascending column of air, the local heating, above the temperature of the environment, gives rise to the pseudo-adiabatic temperature curve, while in the descending column of air the normal adiabatic curve for dry air is followed.

The ascending column of upward convection prevails in cyclonic (LOW) atmospheric circulation, and the descending column of air exists in anticyclonic (HIGH) atmospheric circulation. The diminution of temperature, or cooling necessarily associated with the ascent of air from lower to higher levels is the principal cause of terrestrial rainfall. A forcible example of this form of precipitation is given in notable cases of orographical rainfall, when warm, moist air is forced up and over mountain ranges, as occurs when such air from over the Bay of Bengal ascends the slopes of the Himalayas.

These ascending air currents are cooled by expansion and the lower temperature of the higher levels, at the adiabatic rate of one degree per 100 meters. If now the air is brought down to the surface again, the temperature increases at the normal adiabatic rate for dry air, of one degree per 100 meters.

Ascending and descending air columns are not necessarily vertical, but have an upward component, the actual motion being generally along a gradual incline. There are several

well-known examples of air warming in descending atmospheric columns, such as the Foehn winds that sweep down the Swiss valleys; the Chinook winds which descend from spurs of the Rocky Mountains in western Montana, Idaho and eastern Oregon; also the Peary Down-Slope winds of the Greenland Ice-Cap, descending upon the fjords along the southeastern shore of the Greenland Continent, giving rise to a warm and stifling atmosphere, over these narrow arms of the sea, accompanied with cloud masses and precipitation. Thus both ascending and descending columns of air may result in rainfall. Such circulation may be found when considering the trajectories of air currents in cyclonic barometric depressions, when warm moisture-laden air is thermodynamically elevated from the earth's surface and spread over the top of a mass of colder air.

THE mere mixing of warm and cold air will not give rise to appreciable rainfall capable of measurement, but rather to mist, haze or fog and "traces" of precipitation. Measurable quantities of precipitation can only be realized by the upward convectional currents of cyclonic circulation. Under this condition the amount of rainfall is practically unlimited because the process of condensation continues uninterruptedly, as long as the convectional current continues. A cyclonic LOW may be held over a locality until the very hillsides are washed bare of soil and vegetation, and dry river beds are converted into raging and destructive torrents. Instance the Great Johnstown Flood of May 31st, 1889, with its loss of over 5,000 lives and many millions of property in western Pennsylvania. The cyclonic LOW in that memorable storm remained almost stationary for two days over Lake Erie, during which time the rainfall was excessive in western Pennsylvania and northern Ohio.

Exceptionally heavy falls of rain may result from Line Squalls and violent Thunderstorms when exceptional vertical velocities are suddenly checked and the whole mass of suspended water falls from the clouds as a local discharge of great intensity. An upward current of eight meters per second will sustain rain-drops of five millimeters in diameter. If the upward component be large it may prevent the drops, formed as a result of the cooling, produced by the ascent, from falling to the ground. Once formed a drop is subject to the action of gravity and in still, eddy-free air would ultimately fall to the ground, if it did not evaporate before reaching it. The rate of fall depends on the size of the drop, being very small for small drops. A comparatively small vertical component of the air motion will suffice to keep the drops suspended.

IT HAS been shown experimentally that there is an upper limit to the size of the drops which we can expect to meet with in rain. Under the conditions of an artificially forced upward draft of air, assimilating to natural conditions, the suspension of the drop must be equal to the velocity of the ascending air. Drops larger than five millimeters in diameter were invariably found to break up into a number of small drops. It follows that no rain can fall through a wind having a vertical component exceeding the velocity of about eight meters per second. In exceptional circumstances, as might occur in Line Squalls and their associated thunderstorms, vertical velocities of sufficient magnitude are undoubtedly experienced of ample strength to sustain in the air rain-drops of five millimeters or less in diameter; the larger ones being broken up by offering too great a resistance to the upward convectional currents. Where rain-drops are held in suspension by vertical currents we have an example of the influences at work in all cyclonic storms to localize precipitation and account for some of the remarkable vagaries in distribution, within comparatively short distances.

In this connection it should be noted that an ascending current of eight meters per second or more does not need to persist very long to carry the air up to the level where the temperature is below freezing. Under these conditions the water drops and sprays of water are frozen quickly and converted into snow crystals, sleet or hail pellets, according to the conditions of circulation and condensation. Thus we have the modus operandi of the translation of rain-drops into snow and ice crystals, and in this form they are not subject to disintegration, but fall to the earth as finally formed. The stronger the upward component the longer the frozen particles will be sustained in the air, subject to mixture and increasing size, thereby accounting for the variable sizes of snowflakes and hailstones. The more intense the upward convection the more violent the display of atmospheric electricity and the heavier the thunder squall.

THE more marked the Line Squall the more pronounced the V-shaped cyclonic depression distinctly characterized by the two opposing currents whose trajectories form the barometric trough that sweeps forward, keeping parallel to the linear front. The trajectories on the eastern side of the trough represent an air flow from south to north, while those on its western side indicate a current from north-northwest to south-southeast, gradually extending its regime eastward and forcing its way under the air coming up from the south. This displacement of the surface air by a colder current is not the only cause of precipitation in the V-shaped depression of a Line Squall. Rain generally sets in some hours before the passage of the trough, due to convergence of air trajectories within the southerly wind sector. The spread of the rainfall area on the daily weather map can be sketched by charting the wind directions and tracing the line of separation between the easterly and westerly wind sectors. The rain area follows this line, marking the separation between clear and clearing skies in the westerly sector, and the cloudy and rainy skies in the easterly sector. The Rain Line trends easterly in Spring and Summer, and northerly in Fall and Winter, according to the Summer and Winter types of cyclonic LOWS. The Rainfall types are influenced by the translation eastward of the Rain Line as it shifts from the meridian trend in winter to the latitude trend in summer.

AGRICULTURISTS are continually seeking to ascertain a correlation between rainfall and crop yield. They need further information concerning effective rainfall and the factors which determine how large a proportion of the given amount of precipitation may be utilized. While, for example, the amount of water required to realize a good corn crop has been rather closely determined to be from 250 to 400 pounds of water for each pound of dry matter in a corn plant, yet, in the possession of high correlation coefficients of this sort, the investigator finds it difficult to calculate or predict yields from such data. To realize a crop of 100 bushels of corn per acre will probably require not less than twelve inches of water. Such an amount is readily obtained in the more humid climates, and very often much greater than that amount falls during the limited growing season. But this key amount is not to be depended upon in all localities where irrigation is not normally resorted to. Moreover, when the farmer and the investigator have ascertained the climatological precipitation of any locality they must further ascertain what losses the instrumental total is subjected to, by reason of natural causes, such as immediate

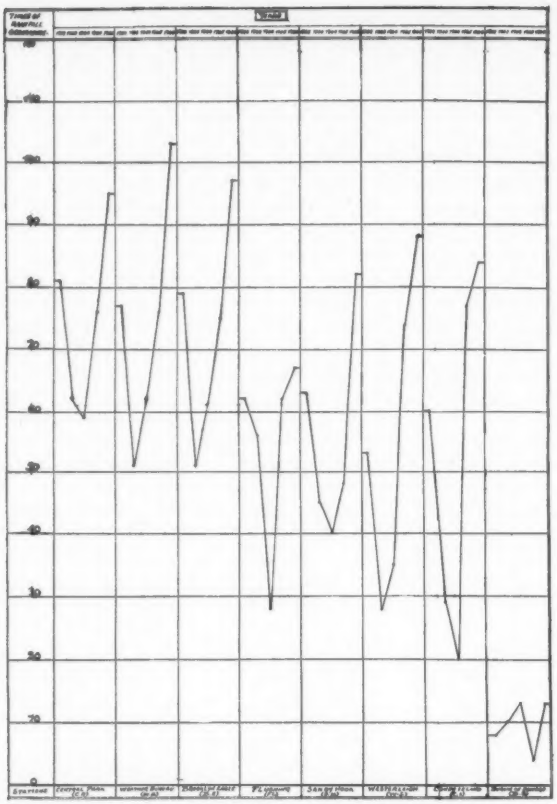


Plate No. XII—A. M. Rainfall (Traces Amounts Too Small to Measure) Correlated by Years (1922 to 1926 Inclusive) and Stations in Greater New York at Ten-Unit Intervals

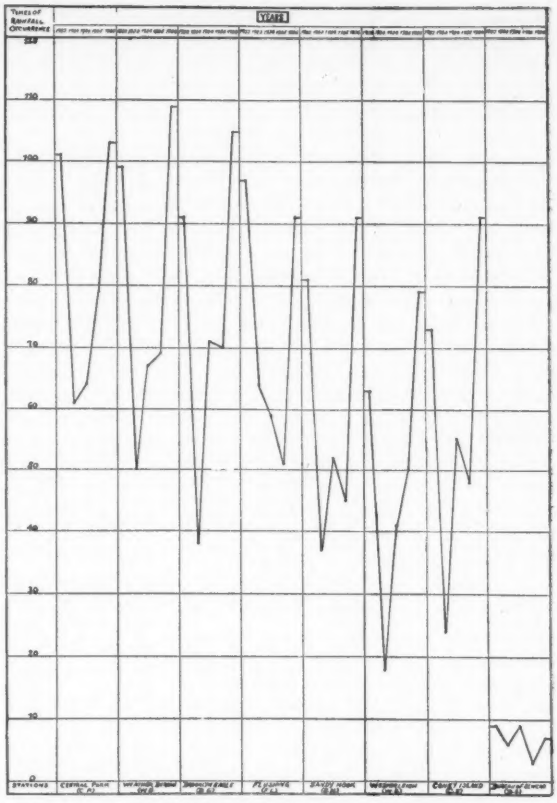


Plate No. XIII—P. M. Rainfall (Traces Amounts Too Small to Measure) Correlated by Years (1922 to 1926 Inclusive) and Stations in Greater New York at Ten-Unit Intervals

Amounts of Rainfall Are Not Given in the Above Diagrams. The Personal Equation of the Meteorological Observer at Each Station Is Indicated More or Less by the Range in Frequency of the Traces Reported. The U. S. Weather Bureau Station Reports the Maximum Number and the City Bureau of Sewers the Minimum Number

evaporation after each storm, transpiration and seepage, and run-off through neighboring streams, ponds and lakes. What remains after these deductions may prove an ineffective total for the required crop production.

Efforts must be made to conserve the usual rainfall and prevent dangerous losses. Forests and windbrakes diminish losses by evaporation, and the mulching of soils with manure and vegetable humus provide for the conservation of storm water. Subsoil turn-overs may prove very beneficial in overcoming losses by transpiration and seepage. The run-off may be greatly diminished by storage reservoirs, the supply of water thus conserved being distributed by irrigation. In the end the agriculturist must admit that effective rainfall is not a function of the climatological or seasonal rainfall, but depends more largely upon the condition of the soil and capacity of the crop for utilizing water.

At this point we are touching upon some of the essential factors in the consideration of the problem of *Crop Insurance*. The farmer must know his soils and how to use them in the conservation of his water supply. From the meteorological expert he must obtain the climatological, seasonal and normal rainfall of his locality, together with the Rainfall Type applicable thereto. From the agricultural economist he will find the amount of precipitation necessary for successful farming, by modern methods, in his locality, and the particular farming system he should follow, both for profit and the protection of his lands from overcropping. Such economical expert should know what statistical correlations show, so far as rainfall is concerned, and that the amount received during critical periods of plant growth, for the several crops of the farmer, is of much greater importance than the annual amount of rainfall.

WE have already shown that the annual amount of rainfall is subject to many losses, through natural causes, that must be overcome by artificial and mechanical means. Nature can be understood and controlled in the direction of the preservation and conservation of natural resources. Having gained the preliminary information herein indicated, the farmer is prepared to address the insurance and rating experts for that protection against crop loss that is measured by the effective rainfall, necessary for normal crop production, during the critical periods of plant growth, for the various crops capable of cultivation and maturity in his locality.

The insurance problem in this case is guaranteeing the amount of effective rainfall for each crop during its growing season. The farmer should know the effective rainfall in inches required for the development of each one of his most productive and valuable crops, and the Rainfall Type governing his locality. This information can be obtained from the proper sources.

The insurance expert must be qualified to judge the merits of the application and verify the claims of the farmer, and determine the factor of safety for his company. As here defined the problem is *a Rainfall Hazard* and the insurance underwriter is relieved of all responsibility and risk

for the care of the crops, their harvesting and marketing.

The weather-rating expert can make a practical climatological survey of the locality, furnish all of the rainfall data and adjust the loss, if any. This system simplifies the whole problem of Crop Insurance, divides the responsibility and places the burden of exercising the requisite amount of watchful care and skill, in protecting the interests of all concerned, in the hands and under the control of the several parties who should assume it.

In the fields of industrial and hydraulic engineering the technical expert is directly interested in the occurrence, distribution, variation and disposal of rainfall, and in the run-off resulting therefrom in drought and flood. He investigates and discusses the modifications of the run-off, influenced by evaporation, topography, geology, temperature, drainage area, watershed, storm-water slope, and various other factors, changing in importance with location and season. It is also important to consider the great variations in the unit run-off under similar rainfall conditions, but different physical conditions, and under similar physical conditions but different rainfall conditions.

The trained engineer must also study the effects of storage of reserve water supply, of cultivation, of forestation, and of other artificial physical modifications of the drainage area, on the occurrence and distribution of rainfall as affecting the flow of streams. In this matter we are touching upon the problem of *Flood Insurance* and how it should be discussed in connection with rainfall distribution and Rainfall Types. Thus we are given an opportunity to view the broad, practical and useful application of the Rainfall Hazard to weather insurance risks.

The laws which control the occurrence and distribution of rainfall, and the circulation of storm water attract attention, and become of practical importance only as comprehension of them permits of such adaptation to human affairs as will reduce or eliminate the injurious results which may otherwise happen, through the employment of inexperienced engineering skill, or by the application of imperfect insurance methods to indemnify for losses incurred.

FAIR weather is pleasing and not disturbing, but foul weather brings, not only discomfort and delays, but by the operation of heavy condensation of water vapor, causes precipitation in the nature of rainfall that seriously interferes with many forms of business and pleasure. The urge and necessities of these interests, in the complexity of modern life, have given rise to contingencies involving financial loss that has called for indemnification and coverage by insurance, and thereby developed the underwriting of Rain Insurance per se.

In its present form the rain policy may be considered an emergency protection designed to indemnify for loss of anticipated income and of incurred or guaranteed expenses. In no instance does the risk cover property damage. Any enterprise, the income from which would be affected by rainfall, may be protected by rain

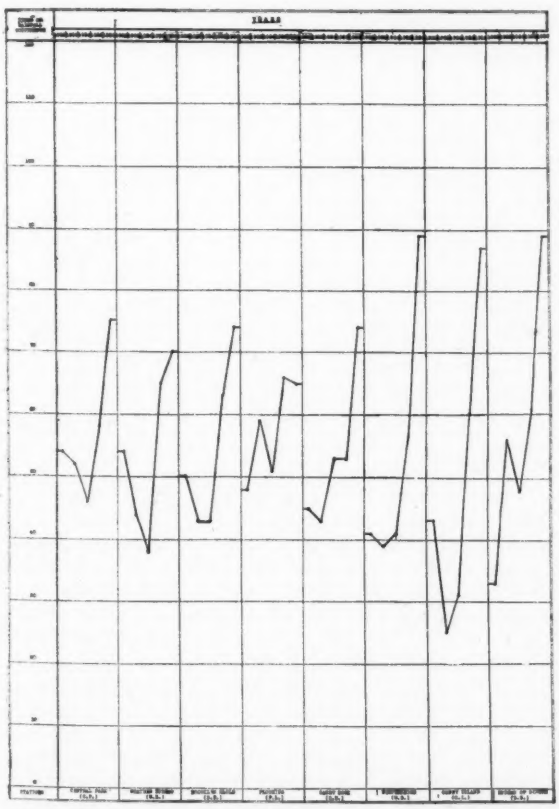


Plate XIV—A. M. Rainfall (One to Ten Hundredths Inch) Correlated by Years (1922 to 1926 Inclusive) and Stations in Greater New York at Ten-Unit Intervals

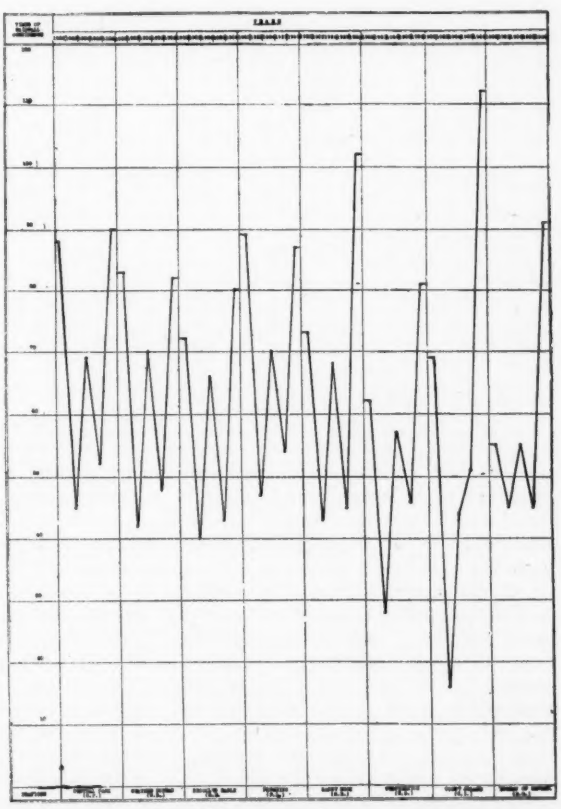


Plate XV—P. M. Rainfall (One to Ten Hundredths Inch) Correlated by Years (1922 to 1926 Inclusive) and Stations in Greater New York at Ten-Unit Intervals

Amounts of Rainfall—Measured by Self-Registering Instruments at All Stations. Exposures of Individual Rain-gages, Dependent Upon Circumstances at Each Recording Station, Are Therefore Not Uniform. By the Use of the Instruments the Personal Equation of the Observer Is Practically Eliminated. These Invaluable Instruments Afford Continuous and Consecutive Records Throughout Each 24 Hours, at the Termination of Which Period, the Recording Sheets Are Changed for New Blanks

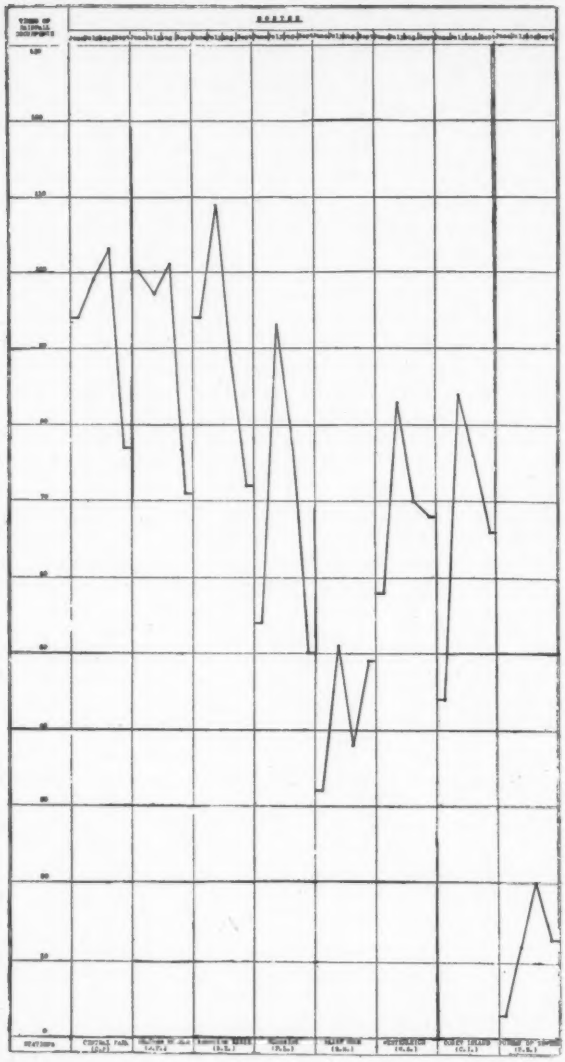


Plate XVI—A. M. Rainfall (Traces Amounts Too Small to Measure) Correlated by Months (June to September Inclusive) for the Five-Year Period (1922 to 1926 Inclusive) for Eight Stations in Greater New York at Ten-Unit Intervals

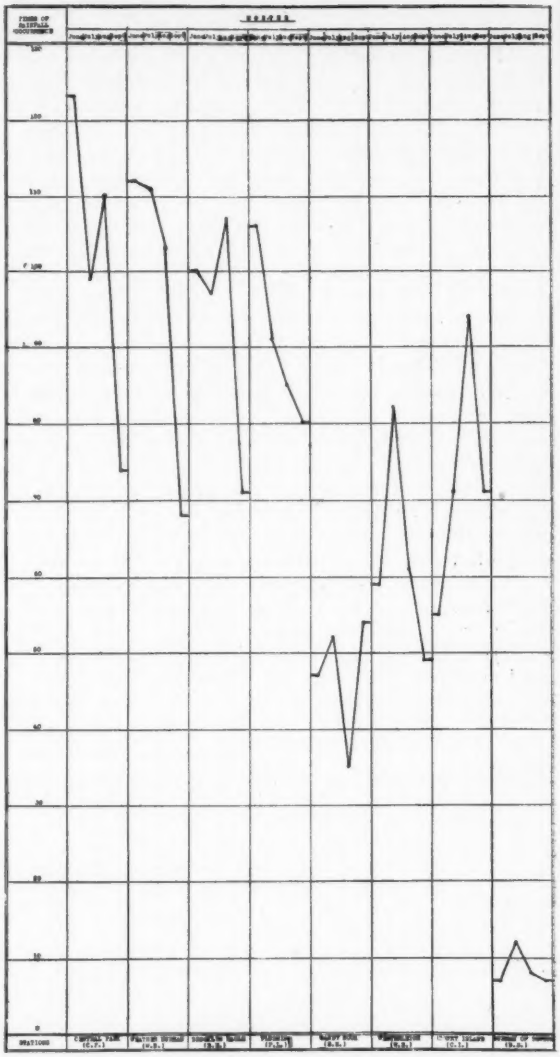


Plate XVII—P. M. Rainfall (Traces Amounts Too Small to Measure) Correlated by Months (June to September Inclusive) for the Five-Year Period (1922 to 1926 Inclusive) for Eight Stations in Greater New York at Ten-Unit Intervals

Amounts of Rainfall Are Not Given in the Above Graphical Chart. The Personal Equation of the Meteorological Observer at Each Station Is Indicated, More or Less, by the Range in Frequency of the Traces Reported. The Brooklyn Eagle Station Reports the Maximum Number and the City Bureau of Sewers the Minimum Number

insurance. The nature of this hazard is such that the occurrence and distribution of rainfall over any given area should be examined and studied from the observations taken at as many different stations, properly distributed, as can be secured and efficiently operated. The system of observations must be uniform and comparable, not only as to instruments employed, but as to the instructions under which the observers take and record their observations. The location and distribution of rainfall stations is of prime importance because of the extremely local character of precipitation, and the variable manner in which this atmospheric element is influenced by other elements, especially the direction and force of the wind. Another matter of much importance concerns the exposure of the collecting rain-gauge, and the instrument should be frequently inspected, not only for measuring and recording the contents, but for observing and correcting any fault in exposure, and for guarding the gauge from any unauthorized handling, or tampering with its position, contents and attachments.

When a group of rainfall observing and recording stations have been established to cover any given area the records must be forwarded weekly to the central office for careful examination, comparison, and the issue of appropriate instructions to cover any irregularity observed by the supervising official. Too much care cannot be exercised by proper authority in the inspection and control of any group of rainfall stations.

The selection of a proper instrument for observing and recording the rainfall is of the utmost importance. Such an instrument should be of standard pattern and approved by the U. S. Weather Bureau. Standard instruments, standard forms and standard methods of observation should of necessity, in behalf of reliable work and economy in time and expenditures, be controlled by the Federal Weather Service. Satisfactory results could not otherwise be obtained in the survey and study of meteoro-

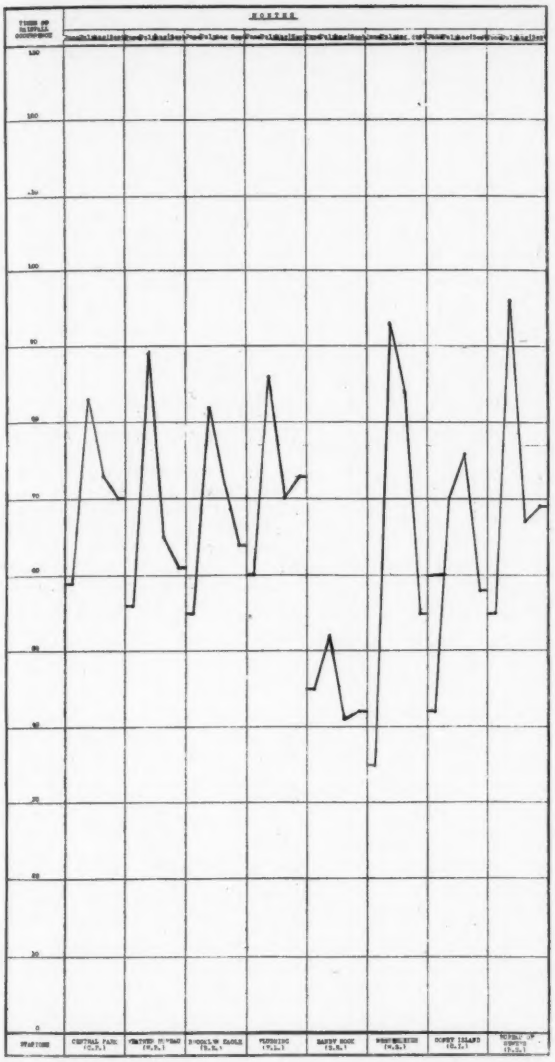


Plate No. XVIII—A. M. Rainfall (One to Ten Hundredths Inch) Correlated by Months (June to September Inclusive) for the Five-Year Period (1922 to 1926 Inclusive) for Eight Stations in Greater New York at Ten-Unit Intervals

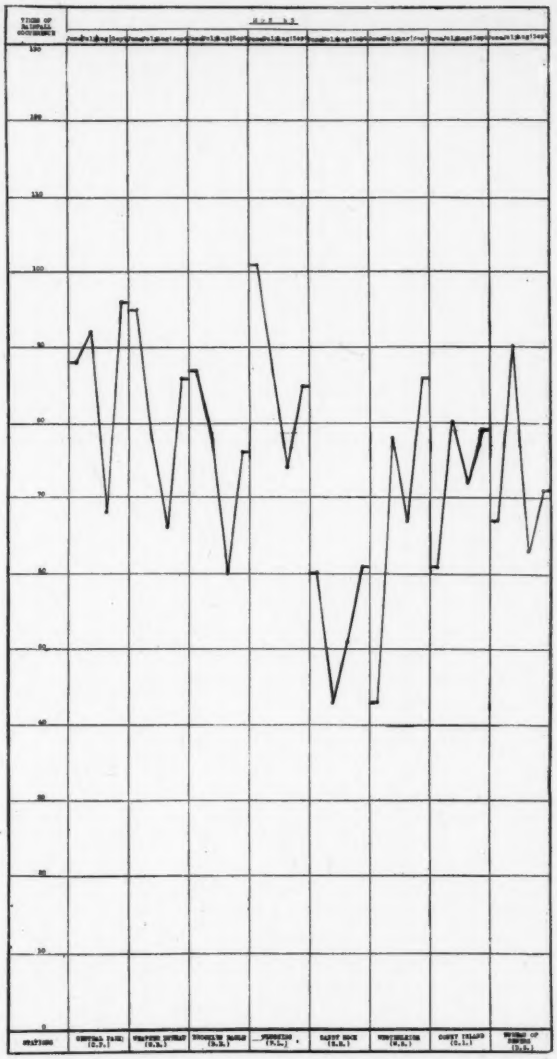


Plate No. XIX—P. M. Rainfall (One to Ten Hundredths Inch) Correlated by Months (June to September Inclusive) for the Five-Year Period (1922 to 1926 Inclusive) for Eight Stations in Greater New York at Ten-Unit Intervals

Amounts of Rainfall Measured by Self-Registering Instruments at All Stations. Exposures of Individual Rain-gages, Dependent Upon Circumstances at Each Recording Station, Are, Therefore, Not Uniform. By the Use of the Instruments the Personal Equation of the Observer Is Practically Eliminated. These Invaluable Instruments Afford Continuous and Consecutive Records Throughout Each 24 Hours at the Termination of Which Period, the Recording Sheets Are Changed for New Blanks

logical problems in the United States. Weather phenomena and conditions are often such that the whole country is involved in the passage from west to east of a single general storm area.

CANADA fully coöperates with the United States in the recording and reporting of daily observations at all stations in both countries. The daily United States and Canadian weather maps embrace all of these reports, including the Alaskan stations, and the twice-daily forecasts of weather, with the issue of storm warnings as circumstances require, together with special and weekly forecasts, depend upon the systematized work and coöperation of the combined national weather services. Coöperation, uniformity and comparable instruments are indispensable to success. This coöperation must include the British stations in the Bermudas and in the West Indies, plus the Cuban and West Indian Weather Services, to which are added the island stations of the Atlantic, plus selected stations in Great Britain and western Europe. All of these hundreds of observing stations report daily by wire to the central office in Washington. To these could be added profitably daily reports from selected weather stations of the Japanese Islands. To these land-station reports we add certain marine reports by radio from commercial ships near enough to the coasts to submit special data that can be received in time for the morning forecasts. As all storms and weather changes pass around the earth from west to east the United States naturally receives the cyclonic and anticyclonic circulations that have passed over Japan from the China Sea, sweep the Aleutian Islands and Alaska, and enter the Canadian Northwest Territory, or pass directly over British Columbia.

The standard rain-gauges of the U. S. Weather Bureau comprise six patterns known by the following designations, that are descriptive of de-

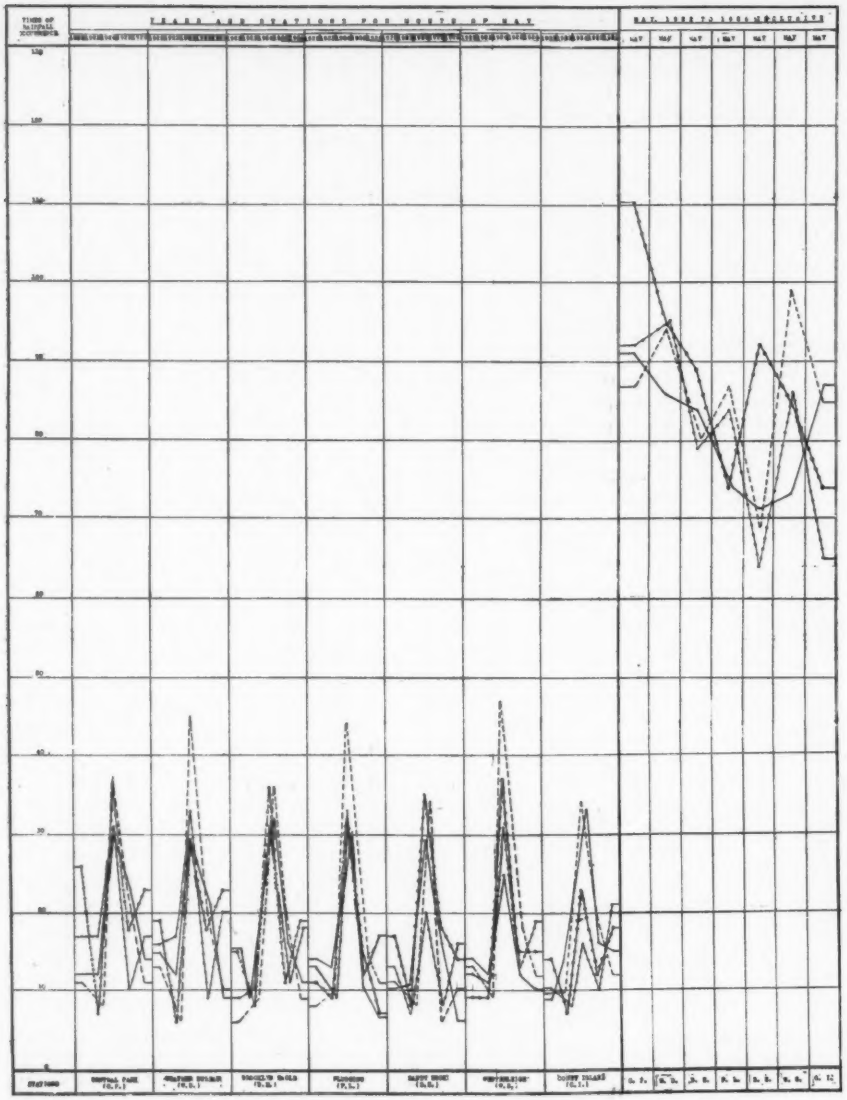


Plate No. XX—A. M. and P. M. Rainfall Occurrences in Traces and in Amounts of One to Ten Hundredths Inch Correlated by Stations and Years for the Five-Year Period, 1922 to 1926 Inclusive, for the Month of May (Opening of Summer) at Seven Stations in Greater New York at Ten-Unit Intervals

CONVENTIONAL SYMBOLS

A. M. Trace Occurrences Indicated by Continuous Line ————

P. M. Trace Occurrences Indicated by Broken Line — — — —

A. M. .01 to .10 Inch Occurrences Indicated by Dash and Dot Line —·—·—·—·—·—·—·—

P. M. .01 to .10 Inch Occurrences Indicated by Dash and Zero Line —o—o—o—o—o—o—o—

Amounts of Rainfall Measured by Self-Registering Instruments at All Stations. Exposures of Individual Rain-gages, Dependent Upon Circumstances at Each Recording Station, Are, Therefore, Not Uniform. By the Use of the Instruments the Personal Equation of the Observer Is Practically Eliminated. These Invaluable Instruments Afford Continuous and Consecutive Records Throughout Each 24 Hours, at the Termination of Which Period, the Recording Sheets Are Changed for New Blanks. The Drum Holding the Sheets Is Turned by Clockwork and the Recording Needle Electrically Operated

sign and method of recording the occurrence of precipitation:

1. Direct Hand-Measurement Gage for recording rainfall and snowfall to the hundredth of an inch. 2. The Weighing Self-Recording Rain and Snow Gage, operated by clock-work. 3. The Self-Recording Float Rain Gage, operated by clockwork. 4. The Tipping-Bucket Electrical Transmitting Rain Gage; the bucket tips at each one hundredth of an inch of rainfall collected, each tip being transmitted electrically to a rainfall recorder placed at any distant location.

5. The Electrical Rainfall Recorder, to be used with a Tipping-Bucket Rain Gage recording each one-hundredth inch of rainfall.

6. The Combined Sunshine and Rainfall Electrical Recorder, to be used with a Tipping-Bucket Rain Gage, recording each one-hundredth of an inch rainfall.

All of the self-registering rain gages are operated by clockwork and the recording sheets of standard forms are wrapped around the drum containing the clockwork. Some of these sheets require changing every twenty-four hours, at mid-day, and others may be continued for the required record during one week. The forms are usually ruled to show five-minute spaces. These instruments are manufactured by Julien P. Friez and Sons, Belfort Meteorological Observatory, Baltimore, Maryland, for many years the maker of standard instruments for the use of the U. S. Weather Bureau at Washington, from which central office the instruments are distributed to about twelve hundred stations in the United States and its possessions. It is to be noted and carefully remembered that self-recording rain gages will furnish the most reliable and competent records for Weather Insurance purposes. The standard forms devised by the Weather Bureau are indispensable for the proper registration of the amounts and occurrences of rainfall, fixing the very moment of beginning and termination of each period of precipitation, and providing the record for any interval in between.

IN THE discussion of rainfall occurrence, distribution and types, we have selected for intensive study the precipitation area of Greater New York. This area is covered by eight self-recording rainfall stations, employing the latest and most improved designs of self-registering rainfall instruments. The records of these stations have been computed, sum-

marized and correlated to show hourly occurrences and amounts, because these elements are best adapted to the solution of Weather Insurance problems. These records are of exceptional value and extension, and are superior to any other similar group of rainfall stations in the United States. They were selected and established for the express purpose of making an intensive study of the rainfall area of one of the greatest municipal centers in the world. This will be the first time that rainfall data of this character has been prepared for publication, and particularly arranged to meet the necessities and interests of insurance organizations engaged in Weather underwriting. Therefore, it is apparent that the analysis and discussion of such data, which we have entered upon in the preparation of this article, will apply with particular force to The Rainfall Hazard as an insurable risk and an insurable interest of more than ordinary value.

The locations of the substations were made with reference to supervision by and comparison with the work of the central station of the U. S. Weather Bureau, located at Battery Park, at the extreme southern end of Manhattan Island. Plates II and III show the location of stations and the treatment of rainfall occurrence for the 5-year period, 1922 to 1926, inclusive. An inspection of the cartographical representation shows that thirty per cent more rain occurs over greater New York, during the hours, noon to midnight, than during the morning hours. It is also apparent that the rainfall increases from the interior of the city towards the suburbs, but this relation might not prevail with all cities throughout the State; therefore, we are not prepared to generalize that cities have less rainfall than the country areas adjacent thereto. The distribution of these stations, with reference to the central office of the Weather Bureau, ranges from a radius of six miles on the north to sixteen miles on the south, and from eleven miles on the east to a radius of about nine miles on the western limit, the average distance being nine and seven-tenths miles. The area covered is about one hundred square miles. The local exposure of the collecting rain gages is subject to considerable variation in the element of elevation above the surface of the ground, varying from 3.3 feet to 394 feet, the maximum being at the central office, where the rain gage is perforce placed on the roof of a 30-story building. The average elevation for the group of eight stations is 86.6 feet. Five of the stations have practically ground exposures, the catching surface of the gages having an elevation of 3.3 feet above the ground. The rain catch at stations having a high elevation on roofs of buildings is about 35 per cent too low, owing to the effect of wind eddies. The best exposure is on the ground and even there no two gages can find an absolutely uniform exposure. The rule that the deficit in percentage equals six times the square root of the elevation, in meters, may be considered an approximate measure of wind effect with elevation.

The variation of rainfall and of its catch with altitude presents a difficult problem in harmonizing, for comparative analysis, the records of any group of stations, when the basis of comparison is on measured amounts. In that case we are required to consider the following factors:

1. Wind Eddies which always exist, absolute calms being so rare as to be negligible.
2. Uniformity in elevation.
3. Correction for elevation.
4. Effect of elevation on measured rainfall.
5. Effect of wind-force on measured rainfall.
6. Influence of local topography on measured rainfall.
7. The effect of evaporation from raindrops falling through dry air.
8. The effect of large groups of buildings and forest areas on measured rainfall.
9. The effect of great land masses (mountains, slopes and plateaus) on measured rainfall.
10. The effect of the proximity of large fresh water areas on measured rainfall.
11. The effect of large areas of cultivated land on measured rainfall.

THE numerous and almost unavoidable errors associated with measured rainfall may be reduced to a minimum by increasing the number of gages in operation over any given area. It would be practicable and not too expensive to operate from one to three standard gages for every square mile of land, depending upon its topography and wind exposure. The more varied the surface and the exposure, the greater the number of gages required to obtain the correct average rainfall over any given area. All gages should be located and set up, and inspected from time to time by an expert meteorologist.

When measuring rainfall, the horizontal area over which we contemplate the measurement to apply must depend largely upon whether we are considering a local rain or a general rain, and this can best be determined by plotting the records on a weather map and observing the connection and influence of the nearest Rainfall Type. A difference of fifty per cent within five miles, or of one hundred per cent in ten miles can easily occur. From a study of many gages located within ten miles of Berlin, a German scientist discovered that even in the monthly totals of recorded rainfalls, gages 1,500 feet apart were subject to a difference of five per cent in general rains, and of 100 per cent in local rains.

No specific and dependable definition of what are known as "local rains" has yet been written by any acceptable authority. The investigation of this subject should be carried to the point of defining the average area covered by a local rain for each Rainfall Type in the United States. The accuracy of rainfall measurements has not been determined satisfactorily, for the very important reason that the principal source of error, due to the action of the wind at the mouth of the gage, is manifestly so irregular and variable that it has been impossible to make an accurate allowance therefor. The U. S. Weather Bureau stations are perforce located in cities of considerable size, for the convenience of commercial necessities and the opportunities for the collection, study and dissemination of synchronous weather observations, required for daily weather forecasts and storm warnings. Supplementing these regular and costly stations, equipped with expensive and complicated self-registering instruments, is a corps of voluntary co-operating stations, supervised by a centrally located State Director, as an official of the U. S. Weather Bureau. In some States these co-operating observers will average about one to a county, and the best organizations are in the Middle West, with the States of Iowa and Kansas leading.

From this necessarily rapid review of the rainfall situation in the United States, the following deductions are permissible:

1. The U. S. Weather Bureau is greatly undermanned and deficient in equipment for the observation, collection and study of rainfall data in the United States.

2. An adequate rainfall service should be organized and maintained under the direction of the U. S. Weather Bureau, to cover all parts of the country with trained observers, reporting to a central office in Washington, for the intensive study and periodical publication of the data collected. As far as possible, the State government should co-operate with the federal government in supporting this service with generous appropriations. The great development in State growth and control makes it necessary for increased concentration of State functions at the State Capitol. All classes of commercial, industrial and agricultural interests appeal more and more to the State central authority for general improvements to aid in business. These improvements involve problems of transportation, forestation, intensive agriculture, health regimes, vocational training

and special educational developments. All of these interests are closely associated with the application of problems in meteorology and climatology that influence their success. Therefore, State Weather Services should be given the most hearty support by State legislators in cooperation with the general, supervisory Weather Service of the United States, located and supported by the federal government at Washington.

3. Probably the most important meteorological problem for each State is the study of rainfall occurrence and distribution. No State in the entire country has given this important matter adequate consideration. As a successful business man, the farmer must be fully acquainted with the Rainfall Types and other rainfall elements affecting the successful issue of his agricultural problems.

4. The farmer must carry Weather Insurance of various kinds and must know how to apply for the same and to judge of the merits of any proposition made to him on that score by insurance agents. He must know the meteorological factors specially applicable to the agricultural development in his locality. Such factors possess an important insurable interest which he must understand in order to protect his property by the best possible line of insurance underwriting.

5. The occurrence and distribution of rainfall is of the utmost importance to agricultural, commercial and professional interests throughout the country. At present we are merely tickling the surface of the rainfall problem.

6. Considering the paucity of rainfall observations in the United States, it is extremely difficult to accurately portray and discuss Rainfall Types, and to practically interpret the idiosyncracies of rainfall occurrence and distribution. Distribution in this sense involves the spread of the rain area accompanying cyclonic LOWS crossing the country from west to east.

7. For insurance purposes *Measured Rainfall* is surrounded and permeated with too many deficiencies to permit of its safe employment, either inductively or deductively for the calculation of net premium rates. This criticism applies with equal force to Rain Insurance, Crop Insurance, and Flood Insurance.

8. Under present conditions, the intensive study of *Rainfall Occurrence* is much more promising of productive, practical and reliable results, in behalf of the safe and profitable development, for insurance purposes, of the Rainfall Hazard, applicable alike to Rain Insurance, Crop Insurance, and Flood Insurance.

9. By relegating to second place *Measured Rainfall,* and concentrating upon *Rainfall Occurrence* and its relative frequency, we eliminate the most insuperable difficulties necessarily attached to the construction, exposure and care of rain gages where accuracy of detail is a prime essential in the exposure, catch and measurement of all precipitation that falls.

10. Until, at least, the country or any portion of it, is covered with a more comprehensive net-work of better equipped and more reliably operated rainfall stations, it is preferable, for the solution of insurance problems, to rely upon the intensive analysis of *Rainfall Occurrence,* and the spread of both local and general rains. This means a closer study of the daily weather map, more time given to cartographical and graphical representations of rainfall data, and the consideration and interpretation of isometric, isoheytal lines.

11. It will be observed that the Third Article on THE RAINFALL HAZARD, has been prepared in demonstration of the efficiency of the Occurrence System, as distinguished from the *Measurement System* of rainfall observations, recording and investigation, as related primarily to insurance interests. In behalf of the particular needs of Rain Insurance and its close alliance with Crop Insurance and Flood Insurance, the entire group is in a position to take advantage of all the benefits of both systems, while relying mainly on the manifest superiority of the *Occurrence System.*

THE graphs that illustrate this article are based on the principles of the Occurrence System. The titles and legends on each graph identify the illustration and indicate the basis and method of construction. Further description and discussion follow to aid in making practical application of the information. The graphs comprise Plates XII to XX inclusive, covering the five-year period, 1922 to 1926 inclusive, and the physical area of Greater New York, to the extent of about 100 square miles, with the center at the southern point of Manhattan Island. (See Pages 20 to 24.)

Plate XII, of A. M. Traces of Rainfall Occurrences by Years, shows the maximum range of sixty-four units at Coney Island, and a minimum of thirty-four units at Flushing. Traces occurred most frequently at the Weather Bureau, with a total of 103 in 1926, and least frequently at Coney Island, with a total of 20 in 1924. The average maximum traces for all stations is 88. The average minimum is 38.7. Traces at the Bureau of Sewers are not comparable with the other stations, being reported differently.

Plate XIII, of P. M. Traces of Rainfall Occurrences by Years, shows the maximum range of sixty-seven units at Coney Island and Brooklyn, and the minimum range of forty-two units at Central Park. Traces occurred most frequently at the Weather Bureau, with a total of 109 in 1926, and least frequently at Westerleigh, with a total of 18 in 1923. The average maximum P. M. traces for all stations is 96.4. The average minimum is 39.9. Traces at the Bureau of Sewers are not comparable with the other stations, being recorded differently.

Plate XIV, of A. M. one to ten hundredths inches, Occurrances of Rainfall by Years, shows the maximum range of sixty-two units at Coney Island, and the minimum range of sixteen units at Flushing. The greatest frequency occurred at Westerleigh and the Bureau of Sewers, with a total of 89 in 1926, and the least frequency at Coney Island, with a total of 25 in 1923. The average maximum occurrences for all stations is 78. The average minimum is 39.5.

Plate XV, of P. M. one to ten hundredths inches, Occurrences of Rainfall by Years, shows the maximum range of ninety-six units at Coney Island, and the minimum range of forty units at Brooklyn. The greatest frequency occurred at Coney Island, with a total of 112 in 1926, and the least frequency at Coney Island, with a total of 16 in 1923. The average maximum occurrences for all stations is 91. The average minimum is 38.

Plate XVI, of A. M. Traces of Rainfall Occurrences by Months, shows the maximum range of forty-three units at Flushing, and the minimum range of nineteen units at Sandy Hook. The greatest frequency occurred at Brooklyn, with a total of 109 in July, and the least frequency at Sandy Hook, with a total of 32 in June. The average maximum occurrences for all stations is 89.1. The average minimum is 57.9. The traces at the Bureau of Sewers are not comparable with the other stations, being recorded differently.

Plate XVII, of P. M. Traces of Rainfall Occurrences by Months, shows the maximum range of fifty units at Central Park, and the minimum range of nineteen units at Sandy Hook. The greatest frequency occurred at Central Park, with a total of 124 in June; the least frequency occurred at Sandy Hook, with a total of 35 in August. The average maximum occurrences for all stations is 97. The average minimum is 61.7. The traces at the Bureau of Sewers are not comparable with the other stations, being recorded differently.

Plate XVIII, of A. M. one to ten hundredths inches, Occurrences of Rainfall by Months, shows the maximum range of fifty-eight units at Westerleigh, and the minimum range of eleven units at Sandy Hook. The greatest frequency occurred at Westerleigh, with a total of 93 in July, and the least frequency at the same station with a total of 35 in June. The average maximum occurrences for all stations is 82.1. The average minimum is 50.4.

Plate XIX, of P. M. one to ten hundredths inches, Occurrences of Rainfall by Months, shows the maximum range of forty-three units at Westerleigh, and the minimum range of nineteen units at Coney Island. The greatest frequency occurred at Flushing, with a total of 101 in June, and the least frequency at Sandy Hook and Westerleigh, with a total of 43 in July and June, respectively. The average maximum occurrences for all stations is 87. The average minimum is 60.

Plate XX, of A. M. Traces of Rainfall Occurrences by Years for May (opening of summer), shows the maximum range of 27 units at Brooklyn, and the minimum range of thirteen units at Westerleigh. The greatest frequency occurred at Brooklyn, with a total of 36 in 1924, and the least frequency at Brooklyn and Coney Island, with a total of 9 in 1923 and 1922, respectively. The average maximum occurrences for all stations is 30.3. The average minimum is 11.

Plate XX, of P. M. Traces of Rainfall Occurrences by Years, for May (opening of summer), shows the maximum range of thirty-nine units at the Weather Bureau, and the minimum range of twenty-three units at Coney Island. The greatest frequency occurred at Westerleigh, with a total of 47 in 1924, and the least frequency at the Weather Bureau and Brooklyn, with a total of 6 in 1924. The average maximum occurrences for all stations is 39.6; the average minimum is 8.

Plate XX, of A. M. one to ten hundredths inches, Occurrences of Rainfall by Years for May (opening of summer), shows the maximum range of twenty-two units at Brooklyn, and the minimum range of ten units at Coney Island. The greatest frequency occurred at the Weather Bureau and Flushing, with a total of 33 in 1924, and the least frequency at Coney Island, with a total of 21 in 1926. The average maximum occurrences for all stations is 30. The average minimum is 13.

Plate XX, of P. M. one to ten hundredths inches, Occurrences of Rainfall by Years for May (opening of summer), shows the maximum range of twenty-eight units at

CORRELATION OF GRAPH DATA—RAINFALL OCCURRENCES
PLATES XII TO XX INCLUSIVE
Five-Year Period—1922 to 1926 Inclusive. Months May to September Inclusive

Plate	Time	Rainfall	Max. Range	Station	Min. Range	Station	Max. Freq.	Year	Month	Station	Min. Freq.	Year	Month	Station	Average Maximum	Average Minimum
XII	A.M.	Trace	64	C.I.	34	F.L.	103	1926	.....	W.B.	20	1924	.....	C.I.	88	38.7
XIII	P.M.	Trace	67	B.E.& C.I.	42	C.P.	109	1926	.....	W.B.	18	1923	.....	W.S.	96.4	39.9
XIV	A.M.	.01 to .10 inch	62	C.I.	16	F.L.	89	1926	.....	W.S.& B.S.	25	1923	.....	C.I.	78	39.5
XV	P.M.	.01 to .10 inch	96	C.I.	40	B.E.	112	1926	.....	C.I.	16	1923	.....	C.I.	91	38
XVI	A.M.	Trace	43	F.L.	19	S.H.	109	.....	July	B.E.	32	.....	June	S.H.	89.1	57.9
XVII	P.M.	Trace	50	C.P.	19	S.H.	124	.....	June	C.P.	35	.....	August	S.H.	97	61.7
XVIII	A.M.	.01 to .10 inch	58	W.S.	11	S.H.	93	.....	July	W.S.	35	.....	June	W.S.	82.1	50.4
XIX	P.M.	.01 to .10 inch	43	W.S.	19	C.I.	101	.....	June	F.L.	43	.....	July	S.H.& W.S.	87	60
XX	A.M.	Trace	27	B.E.	13	W.S.	36	1924	.....	B.E.	9	1922 1923	.....	B.E.& C.I.	30.3	11
XX	P.M.	Trace	39	W.B.	23	C.I.	47	1924	.....	W.S.	6	1924	.....	W.B.& B.E.	39.6	8
XX	A.M.	.01 to .10 inch	22	B.E.	10	C.I.	33	1924	.....	W.B.& F.L.	21	1926	.....	C.I.	30	13
XX	P.M.	.01 to .10 inch	28	BE.WS. & CP.	16	C.I.	37	1924	.....	W.S.	23	1924	.....	C.I.	32.4	7.7
XX	A.M.	Trace	20	.....			91	.....	May	C.P.	71	.....	May	S.H.	.....	
XX	P.M.	Trace	40	.....			109	.....	May	W.S.	69	.....	May	S.H.	.....	
XX	A.M.	.01 to .10 inch	28	.....			92	.....	May	C.P.	64	.....	May	S.H.	.....	
XX	P.M.	.01 to .10 inch	36	.....			110	.....	May	C.P.	74	.....	May	C.I.	.....	

Central Park, Brooklyn and Westerleigh, and the minimum range of sixteen units at Coney Island. The greatest frequency occurred at Westerleigh, with a total of 37 in 1924, and the least frequency at Coney Island, with a total of 23 in 1924. The average maximum occurrences for all stations is 32.4. The average minimum is 7.7.

Plate XX, of A. M. Traces of Rainfall Occurrences in May (opening of summer), shows a maximum of 91 at Central Park and a minimum of 71 at Sandy Hook, a range of 20. Of P. M. Traces of Rainfall Occurrences shows a maximum of 109 at Westerleigh and a minimum of 69 at Sandy Hook, a range of 40. Of A. M. one to ten hundredths inches Occurrances shows a maximum of 92 at Central Park and a minimum of 64 at Sandy Hook, a range of 28. Of P. M. one to ten hundredths inches Occurrences shows a maximum of 110 at Central Park and a minimum of 74 at Coney Island, a range of 36.

The above discussion embraces a minute examination and verification of each graphical line composing the nine graphs illustrating this article. The interpretation of the values thus obtained are summarized and compared in the preceding table, which enables the student to analyze comparative Rainfall Distribution over Greater New York by the Occurrence System, weighing values at each station on a common basis. These five-year values, covering an area of 100 square miles, afford an unusual opportunity for the intensive study of the problems of rating rain insurance, as influenced by the elements of location, exposure and spread. In a succeeding article we will present some of the peculiarities of the hourly distribution of rainfall occurrences. The value of occurrence often outweighs the value of the amount of rainfall involved.

Meeting at Gulfport

THE Board of Commissioners of the American Mutual Alliance, the Board of Governors of the National Association of Mutual Casualty Companies, and the Board of Governors of the National Association of Automotive Mutual Insurance Companies will meet at the Edgewater Gulf Hotel, Edgewater Park, Mississippi, on February 25th and 26th.

Federation and Association Convention

THE 1927 conventions of the Federation of Mutual Fire Insurance Companies and the National Association of Mutual Insurance Companies will be held in Washington, D. C., **October 3rd to 7th, 1927.**

This decision was reached by committees of the two organizations at a meeting held in Chicago.

The host to the convention will be the mutual companies of the District of Columbia and the States of Maryland, Pennsylvania and Virginia.

An organization meeting was held in Washington on February 17th, Mr. Richard Dallam, Secretary of the Mutual Fire Insurance Company of Bel Air, Maryland, being elected Chairman, and Mr. F. D. Leizear, President of the Mutual Fire Insurance Company of Montgomery County, Maryland, being elected Secretary of the General Convention Committee.

Arrangements for the headquarters of the meetings are now being completed and committees are being appointed and plans laid to make the convention one which will attract all of the members of both organizations.

The annual meetings of these organizations have never been held in Washington, D. C. The dates selected are in one of the most desirable months of the year from the standpoint of the weather, and the committee is looking forward to the attendance of not less than 1,000 members at the conventions.

Chamber of Commerce of U. S. Meets in May

THE fifteenth annual meeting of the Chamber of Commerce of the United States of America will be held in Washington, D. C., May 3rd to 5th, 1927. The new building of the Chamber will be used throughout the meeting as the headquarters for registration, group meetings and general sessions, with the exception of one general session, which will be held in the Washington Auditorium.

Traffic Light System

(*Continued from page 6*)

under a separate electrical circuit. When it is desired all three can be operated together, and this provides a substitute control which can be used in the event that damage is done to the control ordinarily used.

But the flexibility which is assured is not entirely satisfactory. The time interval for north-south bound traffic or for east-west traffic must be the same at every corner in the same zone, although some intersections are notably crowded with traffic running in one particular direction. A partial remedy for this condition is provided by manual controlled lights at a few of the intersections. At present traffic moves in one direction for approximately 20 seconds, when the amber light is flashed on, and burns for a period of six seconds. This period seems, from present indications, to be too long, and it is expected that it will be cut to something like a three-second interval.

Under the present system the lack of jay-walking pedestrians is noticeable. Automobile drivers also are noticeably obedient to the traffic lights, and the number of accidents, both personal and vehicular, have decreased.

Although street cars were delayed under the original synchronous plan, the traffic control in use now allows them to operate through the loop at their usual running time. This is possible also because street cars are allowed to turn right on the red light, although other vehicles can turn only on the green light. The privilege given to the trolleys keeps traffic moving where otherwise it would be stopped. Congestion would be unavoidable if the trolleys had to wait for the green light for twenty-second "go" period is too short to allow traffic to move according to schedule.

Probably further changes will be made in the Cincinnati system. It is a marked improvement over the original synchronous plan, but it does not measure up to some of the newer light controls. Take, for example, the system used by Chicago, whose traffic problems were studied by expert traffic engineers and worked out so carefully with paper and pencil that when the system was put into actual use only the most minor changes were required.

CHICAGO makes no promises that an automobile can travel through the Loop without a stop; but the city's traffic engineers do say that the movement of traffic has been speeded up from 25% to 50%, and that cars which formerly required from eight to twelve minutes to cross the Loop now take just half that time. Approximately, the last count showed 350,000 automobiles in Chicago, and it is safe to estimate that at least another thousand pass through the city every day.

If the men who founded Chicago ever considered the problem of traffic, the city might have been located differently. For it is bounded on three sides by lake and river, and the bridges over the river, which are of the drawer type, cause serious traffic congestion. The Loop, the most important business section of the city, is controlled by signals on 49 corners.

AN ARTICLE
ON
"LEGAL PROBLEMS OF INSURANCE"
BY
ALBERT W. FRIBOURG
WILL BE
PUBLISHED IN AN
EARLY ISSUE

The Chicago system is distinguished by its flexibility. Although all lights operate on a constant cycle (the sum of the length of the green, red and amber lights is the same at all corners), the percentage of the total cycle apportioned to a particular color at any intersection can be determined without limitation to meet the traffic conditions there. For example: at the intersection of Wabash and Madison the timing might be 54 seconds on Madison against 27 seconds on Wabash, while at the next corner of State and Madison the timing might approximate 47 seconds on Madison and 34 on State. The time when the green light should be shown is predetermined to keep traffic moving at a certain speed, and is varied according to the time of the day or the day of the week. Sunday the lights are regulated with an eye to the number of pleasure cars on the road, the popular destinations and routes.

As is always the case, the slowest vehicle on the road sets the pace, especially when the roadway is too narrow to allow passing on either side. Three-quarters of the people who ride through the Loop ride in street cars. Traffic lights must be designed to keep street cars moving instead of stopping them if congestion is to be avoided. A car entering the Loop may have to wait before it passes the first light, but once it catches the green light it is in the co-ordinated system and is carried as on the crest of a wave. The street cars can be moved with facility, because the time required for stops and starts, loading and unloading was figured out carefully, checked and rechecked many times before the light control system was installed. The time needed for unloading and loading has been figured out as closely as possible and this time is allowed to counter traffic, so that the street car can start as soon as the traffic light gives the signal.

Left-hand turns, another traffic problem liable to tie up streets very effectively, have been eliminated from the Loop. Neither street cars nor free-wheel vehicles are allowed left-hand turns on the green lights on streets bounding the Loop district, and no parking is allowed on these streets. Right-hand turns are always made on the green light.

Because of the narrowness of the streets, few safety zones are used in the Loop. Personal accidents, however, are avoided, because automobiles must wait *in back* of street cars which are unloading or loading. There has been little trouble so far with drivers who refuse to obey traffic signals, and traffic officers who formerly had to spend their time directing traffic now direct pedestrian traffic and are cutting down materially the number of accidents because of jay-walking and careless dodging between vehicles.

SO MUCH for the effectiveness and the working of the system. The mechanics of the light control plan are complicated and involved. The five control wires from each intersection are interconnected as though there were only one set of three lights hung from a span at the corner, and are run to the central control board in the City Hall. Voltage drops in conductors are arranged for by applying the maximum voltage to the most remote signal and "ballasting" the near signals with suitable resistance to bring about the necessary voltage drops at these points.

In the City Hall each set of wires is connected to the terminals of an in-

(*Continued on page 30*)

On This Line

(Continued from page 10)

that point as quickly as possible by appealing powerfully to his most motive form of interest—*self-interest*—along the very lines which have been the subject of so much of the preceding material in this series of articles.

The second kind of call-back is the product of procrastination, and obviously calls for greater emphasis upon the *dangers of delay*. The only thing of which a prospect of this particular type is more afraid than he is of making a decision, is of the losses or disasters which he may bring (and probably frequently has brought) upon himself as a result of his unfortunate habit! In stressing those dangers there is distinct probability that the tendency to procrastination may be swept aside at least so far as that particular proposition is concerned.

It is harder to meet the third kind of call-back because the prospect is likely to have "made a rule" never to close in the presence of the salesman; but the author of these articles on one occasion closed six such cases without one call-back, by applying the same reasoning given above (in explanation of what actually happens when a prospect tries to "think it over") *to the prospect's own selling problem*, showing how call-backs robbed *his* salesmen of sales and giving him a powerful impulse to give the same idea to all his own men so that they could and would avoid many such call-backs in the future. Having accepted the validity of the idea as applied to his own business, it is comparatively simple to secure his acceptance of it also as applied to our interview and the proposition under consideration! Anyway, it WORKED, which is the one unanswerable proof of practicability.

THERE are, however, two kinds of call-backs which are genuinely unavoidable. The first is based upon the need to secure additional data before the contract can be closed, and there is obviously nothing to be gained in pushing for a close under those conditions. The wise salesman in that case will think hard to find a way in which *he* can do most or all of the work of assembling the desired data as swiftly as possible, because he realizes that the prospect is likely to keep on putting it off, and that each day's delay serves to undo the work of conviction which he has already completed. Where he cannot collect the data, he will at least emphasize the dangers or losses involved in *delay* and set a definite date at the earliest possible time for the conclusion of the matter.

The other kind of unavoidable call-back is based upon the prospect's need to "talk-it-over" with someone else—wife, husband, general manager, etc.—before a decision can be given. When the salesman is sufficiently convinced that this is not merely a "stall" due to the incomplete or unconvincing character of his own demonstration, there is but one thing for him to do, and that is to change his objective and "close" the prospect on the proposition of permitting *him* to make that second demonstration. If, as so often happens, it is left to the *prospect* "to sell" the second party to the sale, not only do all the objections explained under the third type of "think-it-over" call-back militate against a successful presentation of the proposition to that second party, but also there is the additional danger, amounting almost to a certainty, that the second party will think up objections which never came up at all during the original interview, and to which the prospect therefore has no adequate answers. He will probably try to think up some on the spur of the moment, since he is now in the position of defending the proposition, but in the absence of definite facts and proof upon which to base them, they are not likely to be very convincing, are they? All dangers of the sort can be done away with only in the one way—by the salesman himself making the subsequent demonstration with the firm resolve to *close* it just as he would have closed the first prospect if the "talk-it-over" call-back had not intervened.

Call-backs *kill* far more sales than they *close*, in addition to wasting hours and hours of the salesman's working capital of TIME; so it is unquestionably and demonstratably true that NOTHING will add more to an insurance salesman's efficiency than just to fix his mind upon this matter of call-backs, until he has learned from his own experience just how wasteful and unnecessary most of them really are!

The End of the Series

Why the Road Went North

(Continued from page 14)

mock. Blazes will guide us. In the spring we'll find it as beautiful and gentle up there as we found it sullen and harsh while waiting for the boat."

"Hockomock is vera much like your father-in-law," chuckled the Scot. "By the way, Benny, I have some mail for ye. Ye may care to look at it before leaving."

Impatiently tearing open a long, official looking envelope, Lodge was giving it but a glance; then his eyes widened and he whistled softly.

"What is it, dear?" murmured the bride.

"By heavens! The old boy has put one over on me. No holiday at Hockomock—but business. The office directs me to locate the route north of Hockomock."

"I kenned ye were vera likely to change your mind," observed McIntosh, his frosty blue eyes twinkling brightly. "I'm a director in the road now." And that's why the road went north of Hockomock.

Life Lights

(Continued from page 17)

hear it now. But this much may be affirmed—to Darwin and his work you owe a better understanding of life and the world in which it must be lived; you owe the breaking down of barriers of ignorance and prejudice, and the liberating of thought; you owe a sense of the kinship of all life and a knowledge of the process by which life unfolds and advances. You may not be conscious of it, but in a hundred ways the truth which Darwin disclosed has become a part of the world's thinking, and has contributed to the solving of its problems."

"I'll tell you what I'll do," I said. "I'll give you a whole evening to expatiate on Darwin, and if you can prove to me that what you say is so I will double my reverence for February 12."

"Agreed," he answered. "It's a fair proposition. In the meantime I am grateful to you for having directed my attention to the fact that God and evolution united to produce two such great personalities on the same day in the same year as Darwin, the seeker of human origins, and Lincoln, the server of human aspirations!"

All Explained

HUBBY—"Well, goodby, my dear; if I'm prevented from coming home this evening, I'll send you a note."

WIFIE—"There's no need; I have already taken it out of your letter-case."—*Meggendorfer Blaetter (Munich).*

Same Old Gibberish

"Anything seem homelike in Russia?"

"Only the brakeman calling stations in Russian."—*Louisville Courier-Journal.*

Traffic Light System

(*Continued from page 28*)

dividual relay. On the control board 54 relays are mounted in a bank, and each relay is the control for an intersection, which, since there are only 49 intersections, allows five spares for use in emergencies when any of the controls balk.

The propelling power consists of a 1 h.p. electric motor and gear drive in duplicate; a single throw of a lever disengages one clutch and throws in the other motor and gear reduction drive. The speed of the motor is reduced by a set of gears that drives a horizontal shaft along the bottom of this relay bank. A vertical shaft, driven from the horizontal shaft through bevel gears, rises just behind each vertical tier of relays and propels each one separately. The four electrical contacts of each relay consist of coin silver points, the upper one in each case being raised or lowered by cams. Condensers wired across the contacts reduce arcing to a minimum. The individual cams can be controlled separately from the face of the relays and can be co-ordinated in their relationship of operation. The adjustment feature is on the face of the panel board and is easily adjustable over a graduated dial. The adjustment of the amber light, however, involves a difficult manual movement which requires skill. In traffic regulation the amber light shows for three minutes, during which all traffic remains at a standstill. Three $250 a month men are in charge of the system at the City Hall.

TRAFFIC accidents have been reduced 25% in the five months following the installation of the new traffic control system. There were 210 persons injured in the Loop in 1925 during the same period of the year, while 162 persons were injured in 1926. The decreased personal accidents are somewhat dependent upon the number of traffic officers who are free to direct pedestrians rather than vehicles. No city which has installed automatic traffic regulating systems has found that the number of officers necessary has been decreased. But the officers can be stationed at different places and attend to other things besides the regulation of traffic. As a matter of fact, the number of traffic officers must be increased when traffic lights are installed for the simple reason that more care and thought is being expended on the traffic problem.

There is little doubt but that traffic regulation by lights can be improved upon as it exists now, and also there is no doubt that the present system of traffic lights is decreasing the number of personal and vehicular accidents and is increasing "what the traffic will bear."

Finds Most Accidents Occur in Small Shops

THAT thousands of small shops, factories and industrial establishments are making no real effort to conserve the lives and limbs of their employees is the belief of W. Dean Keefer, director of the industrial division of the National Safety Council.

A survey made by special investigators representing the accident prevention institution discloses that small workshops have more accidents than larger establishments. For instance, a group of ten factories with a total of 1,000 workers has a worse accident record than one large plant with the same number of employees.

Analysis of the reports received from the investigators, who visited 299 small plants in Michigan, Illinois, Indiana, Kentucky, Ohio and Rhode Island, reveals the following fundamental unfavorable facts:

The only records that are kept of accidents that occur in small plants appear to be those made out for the insurance companies and state officials. The average small plant executive declares and actually believes he has no accidents in his plant. He is too busy to pay any attention to accident prevention.

Small plants pay their compensation insurance premiums and, after complying with the demands of the insurance companies and state officials, assume they have no further responsibility to safeguard their employees.

These executives do not realize that accidents cost them approximately four times as much as they cost the insurance carriers.

As a result of the facts brought out by the inquiry, which is believed to reflect the situation throughout the country, the National Safety Council is going to launch a campaign to interest particularly small plants in organized accident prevention activities. Efforts will be made to induce small plant owners and executives to keep and analyze records of their accidents. The council has prepared a comprehensive program designed especially for the proprietors and managers of small factories, workshops and industrial establishments, details of which may be secured, free of charge, by addressing the council, which has headquarters in Chicago.

Tells How to Avoid Accidents in Homes

PRACTICALLY all of the 20,000 fatal accidents that took place in American homes last year could have been prevented if the victims had been careful, avers Homer E. Niesz, Vice-President of the National Safety Council, which is endeavoring to conserve the lives and limbs and property of persons while they are working, walking, motoring, swimming, or resting at home. Here are some safety suggestions for housewives:

Taking down pictures may result in a fatal fall if you don't use a substantial stepladder, instead of a rocking chair or some other substitute.

Put Eddie's express wagon where nobody will trip over it.

Slipping on icy pavements can be prevented if every property owner and tenant will sprinkle some sawdust, dirt or ashes in front of their buildings.

Make sure that the garage doors and windows are open when anybody starts the engine in the family car and you'll prevent another case of carbon monoxide poisoning.

Be careful lest you are shocked through handling electrical appliances. Always buy from responsible houses that sell standard products. Read the instructions issued by the public utility companies carefully and be sure to follow them, if you would live a little longer.

Remember, home dry cleaning is not always economical. Be especially cautious when handling explosives used for this purpose.

POSITION desired with progressive mutual company by married man, age 34. Fifteen years' experience fire and tornado insurance business, three years executive capacity. Understand underwriting and accounting thoroly. Best of references. Address Box E., Glencoe, Minnesota.

Bits of Wit

"LIFE WITHOUT LAUGHING IS A DREARY BLANK"—*Thackeray*

Relieving His Feelings

FIVE-YEAR-OLD DAUGHTER—"Look at that funny man across the road."

MOTHER (looking in shop window)—"What is he doing?"

"Sitting on the pavement talking to a banana skin."—*Tit-Bits.*

Only Smart Alecs Damaged

A college education never hurt anybody who was willing to learn something afterward.—*Boston Transcript.*

Fellow Feeling

DEAN—"Do you know who I am?"

STUDE—"No, sir, but if you can remember your address I'll take you home."—*Brown Jug.*

Party Wire

PROF.—"Have you ever done any public speaking?"

STUDE—"Well, I proposed to a girl over the telephone in my home town once."—*Georgia Tech. Yellow Jacket.*

Inflammatory Reading

The high spot in this issue is what causes fires in grocery stores.—*Trade paper.*

Sunny Side of an Eon

The bones of a woman presumably a million years old have been found in Asia. But you'll never get her to admit she is a day over a hundred thousand.—*Life.*

Such Is Progress

Lovers in the old days gassed on the step; nowadays they—oh, you finish it!—*Farm and Fireside.*

Tickling Teacher's Ear

TEACHER—"Willie, can you name a city in Alaska?"

WILLIE—"No, m'm."

"Correct."

—*Christian Science Monitor.*

Familiar Touch

STICK-UP MAN—"Gimme your money!"

MR. PECK (absent-mindedly)—"Yes, my dear."—*Colgate Banter.*

Mrs. Noah Identified

"Oh, Papa, can you tell me if Noah had a wife?"

"Certainly; Joan of Arc. Don't ask silly questions."—*London Tit-Bits.*

Now, Girls

Vast supply of fresh sea fools. Come early and get your choice.—*Michigan paper.*

Get a Hook

A little girl at dinner table was given a dish of noodles. The mother noticed that she was eating nothing but the soup, leaving the noodles. She asked her why she did not eat the noodles, too.

Unconcernedly she answered, "Can't catch 'em."—*Christian Evangelist.*

Profanity by Command

Washington.—(AP)—The Navy Department announced late Thursday that Midshipman Earl Blair Zirkle of Kansas, who declined to accept his commission recently, has changed his mind, and Secretary Wilbur has directed the superintendent of the Naval Academy at Annapolis to swear.—*Milwaukee paper.*

Juicy Moron

"Why does Mary call you maple syrup?"

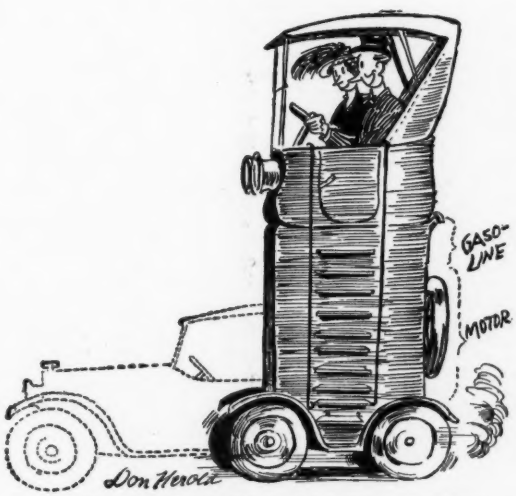
"Because I am such a refined sap."—*Buccaneer.*

Getting Even

JUDGE—"Haven't I seen you before somewhere?"

DEFENDANT—"Surely; I taught your daughter singing lessons."

JUDGE—"Fifty years."—*Washington Cougar's Paw.*



CITY STREETS AND PARKING PLACES WILL ACCOMMODATE TWICE AS MANY AUTOMOBILES WHEN THE VERTICAR IS MADE COMPULSORY BY LAW. DOTTED LINES INDICATE SPACE WASTED BY PRESENT TYPE OF MOTOR CAR.

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Landing a Passenger

Ruth rode in my new cycle car
In the seat in back of me;
I took a bump at fifty-five,
And rode on ruthlessly.

Boston Beanpot.

A Peach of a Skirt

PEACHES—"I'd like to try on that rose dress in the window."

SALESMAN—"Sorry, Miss. That's the lampshade."—*Western Christian Advocate.*

Beyond Compare

"Are mine the only lips you ever kissed?"

"Yes, darling, and the nicest."—*Tit-Bits.*

Safe and Sound

Stop and let the train go by,
It hardly takes a minute;
Your car starts off again intact,
And better still—you're in it.

—*Boston Transcript.*

He's the Chorus

"Is he self-centered?"

"Self-centered? Why, that guy thinks 'Hail, hail, the gang's all here,' is a solo!"—*Life.*

Coming Down to Brass Tacks

One Hawaiian guitar to exchange for sow pig, two or three months old.—*South Carolina Market Bulletin.*

Papa's Precious

"The children need something new every week. You have no children, hence you can not understand."

"I understand, old chap; I have an automobile."—*Boston Transcript.*

All Busy

The mother was ill in a home where a radio had recently been installed. The doctor came and small Emily looked on wonderingly as he used the stethoscope. "What station is he trying to get, mother?" she asked, when she could no longer contain her curiosity.—*Capper's Weekly.*

The Miserable Male

A lecture was recently given on "How the Worm Conducts Its Courtship." Any married woman could talk at length on a subject like that.—*London Passing Show.*

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The pace of the individual is regulated by the pace of the crowd. When we appreciate this fact, we drive our cars more wisely. We think less of "dumb-bells" and more of helping the safe movement of traffic by safe driving.

The possession of a car imposes an obligation—the obligation to keep it from being an instrument of death and injury—and obligation to drive it with respect to the rights and considerations of others.

There's more pleasure and infinitely more safety in being in gear with the traffic mass, than being the lone romping wolf on the traffic lane.

Wise, considerate driving will reduce accidents and injury.

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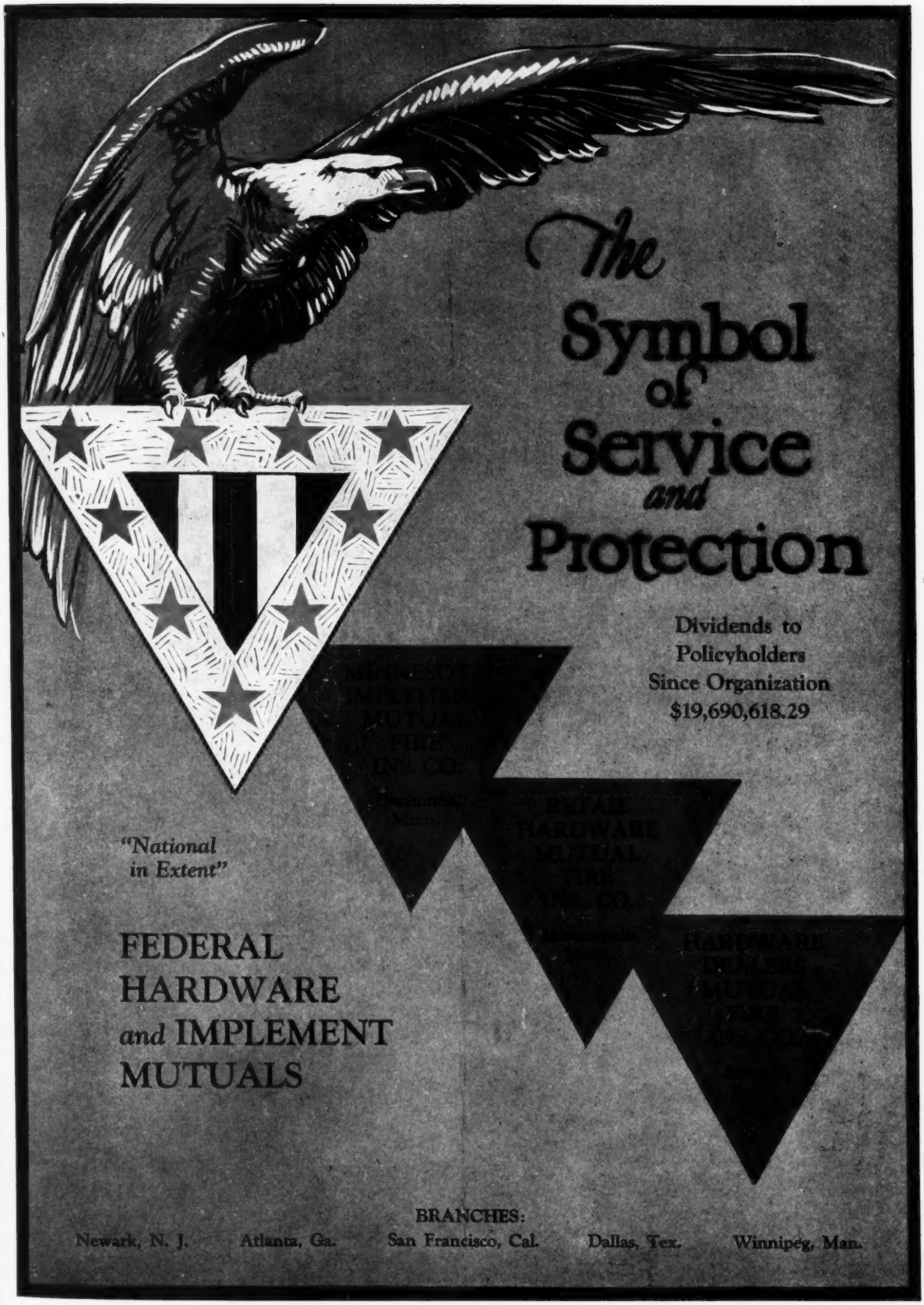
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